

# **JONESPORT HARBOR MAINE**

## **SURVEY REPORT**



**DEPARTMENT OF THE ARMY  
NEW ENGLAND DIVISION, CORPS OF ENGINEERS  
WALTHAM, MASS.**

**AUGUST 1972**

CD-5

EXECUTIVE OFFICE OF THE PRESIDENT  
OFFICE OF MANAGEMENT AND BUDGET

WASHINGTON, D. C. 20503  
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OFFICE  
SECRETARY OF THE ARMY

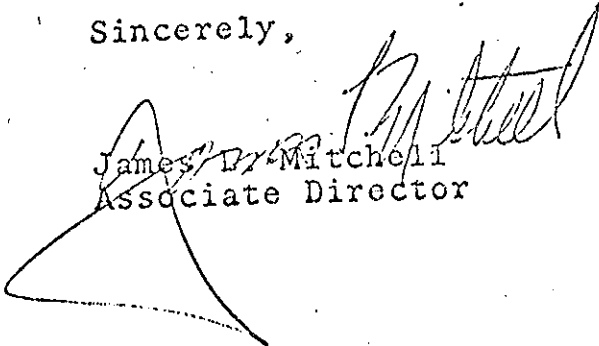
Honorable Martin R. Hoffman  
Secretary of the Army  
Washington, D. C. 20310

Dear Mr. Secretary:

Mr. Charles R. Ford's letter of June 13, 1975, submitted the report of the Chief of Engineers on Jonesport Harbor, Maine, authorized by Section 304 of the Rivers and Harbor Act, approved October 27, 1965.

There would be no objection to the submission of the proposed report to the Congress. However, no commitment can be made at this time as to when any estimate of appropriation would be submitted for construction of the project, if authorized by the Congress, since this would be governed by the President's budgetary objectives as determined by the then prevailing fiscal situation.

Sincerely,

  
James B. Mitchell  
Associate Director

604673

## ADDENDUM

### Jonesport Harbor, Maine

I. INTRODUCTION. The water resources improvement study for Jonesport Harbor, Maine has been undertaken to determine the need and economic justification for providing a Federal navigation improvement project in the harbor. This addendum is a supplement to the Jonesport Harbor Survey Report prepared by the New England Division and dated August 1972, as revised. The addendum is intended to present an abbreviated application of the Principles and Standards for planning water and related land resources as a basis for selection of a plan of improvement.

II. PLANNING OBJECTIVES. The planning objectives of the study are to determine measures which may be undertaken to provide an adequately sheltered mooring area for the local fishing fleet, and the extent of Federal participation in constructing and maintaining the improvement.

III. SUMMARY OF STUDY AREA CONCERNS. Jonesport is located about 190 miles northeast of Portland, Maine and about 40 miles from the Canadian border. The harbor extends along the shore east to west about 3 miles and is unprotected from storm driven winds and waves. Water depths immediately adjacent to the mainland are relatively shallow, however, within a few hundred feet of shore, depths increase rapidly to 40 feet. Sawyer Cove, about one quarter mile east of the center of town, forms a partly sheltered natural anchorage with depths from two to eight feet at mean low water.

Jonesport is in Washington County, which has been declared a Title IV(1) area of persistent and substantial unemployment by the Economic Development Administration. Although the town derives some income from seasonal visitors, the principal means of livelihood is commercial fishing and its related activities.

There is no existing Federal navigation project at Jonesport Harbor, and there has been no prior report made for the harbor. All development to provide and improve waterfront facilities has occurred with local public and private funds. There are thirteen privately owned wharves in the harbor, twelve of which are used by local fishermen and one which is used for receiving about three million gallons of petroleum products annually. In addition to providing fuel for the local fishing fleet, these products are distributed throughout Washington and Hancock Counties by truck. There are twelve fishing companies and three boat building firms in town. The local fish catch primarily consists of lobster, herring, scallops, shrimp and hake.

With the exception of Sawyer Cove, the shoreline along the Jonesport waterfront offers no sheltered mooring area for the local fishing fleet. Boats and lobster cars suffer damages during storms by breaking their moorings and being blown onto the rocky coast. Additional extensive damage occurs during winter months from ice packs traveling through the area. A Coast Guard ice-breaker has been called upon to rescue or retrieve boats which have been carried away by ice floes, in addition to breaking ice in the harbor and cove. It is difficult and at times impossible to land cargo during rough weather. This discourages local interests from developing an adequate terminal from which fishermen can operate.

IV. DESCRIPTION OF THE RECOMMENDED PLAN. Pursuant to detailed analysis of all data obtained and evaluated during the course of the study, the recommended plan of improvement consists of construction of a breakwater 1,200 feet long across the entrance to Sawyer Cove, an entrance channel 8 feet deep and 100 feet wide into the cove and two anchorage areas in the cove, one being 9 acres and 6 feet deep and the second being 6 acres and 8 feet deep.

The breakwater would be constructed of steel sheet piling formed in cells of 30 feet diameter with connecting diaphragms, having a top elevation of 6.5 feet above mean high water. A trench will be excavated and backfilled with sand to provide a suitable foundation for the structure. The cells will be filled with sand and gravel and the entire structure capped with a 3-foot thick layer of cover stone.

The final environmental impact statement for this project was submitted to the Office of the Secretary of the Army in August 1973.

V. DESCRIPTION OF THE ENVIRONMENTAL QUALITY PLAN. Construction of a protected anchorage area at Jonesport Harbor will afford year-round protection to the estimated 63 fishing boats that would utilize the harbor as home port. The entire Jonesport coastline was examined and only two sites lend themselves to being appropriate for detailed consideration. One site being just easterly of Beals Island Bridge and the second site being Sawyer Cove.

The bridge site, similar to other considered shore areas, necessitates an excessively long breakwater to provide an anchorage area of sufficient size to meet the needs of the entire fleet. Sawyer Cove is the only area which offers some natural protection from storm waves and ice floes and is large enough to accommodate the entire fishing fleet. The land mass around the cove and the length of the cove prevent ice that moves with tidal currents from penetrating into the cove to any great extent. Consequently, Sawyer Cove was selected as the site for the project.



Alternate breakwater designs, including an anchored inflatable barrier and rubble mound structure, were considered prior to selection of a steel-walled cellular structure. An inflatable barrier would be expensive to maintain and would be adversely affected by the 11.5-foot tidal range. A rubble mound structure would require excavation of a much larger amount of bottom material and placement of additional sand and stone to form a suitable foundation to support this type of structure.

Lesser channel and anchorage dimensions will not be in the best interest of safe navigation. To meet the requirements for two-way traffic, a minimum channel width of 100 feet is considered necessary. Increasing this width will not provide greater advantage. Decreased anchorage areas will produce overcrowded conditions, limit access maneuverability and affect growth potential of the fishing fleet. Therefore, project dimensions have been established to maximize safety and growth.

An alternative to project construction is no development of the harbor. The consequence of this action would be that commercial fishing activity for the area will not reach its full potential, vessel damages will not be reduced and commercial activities associated with the fishing industries will not expand and may in fact find it more desirable to relocate to another better developed port. This would have an adverse economic, social and environmental impact upon the entire local population. Consequently, to do nothing is an unacceptable alternative.

Investigations indicate that there is no non-structural method of fulfilling the planning objectives for this project. Furthermore, of the structural possibilities for providing safe anchorage areas, the recommended plan of improvement minimizes adverse environmental effects. Therefore, the environmental quality plan for Jonesport Harbor is the recommended plan.

VI. IMPACT ASSESSMENT. Implementation of the recommended plan of improvement (which is the EQ plan) will require limited necessary trade-offs of natural resources. Potential significant environmental impacts identified with the proposed breakwater construction and channel and anchorage dredging/disposal operations include:

a. Reduced tidal action in Sawyer Cove. Water circulation and interchange will not be affected because of the 11.5-foot range of tide. No stagnant water entrapment will occur.

b. Some potential breeding area will be eliminated at the breakwater location; however, the surrounding area is capable of absorbing increased populations.

c. Short-term reduction in pelegic and benthic population densities, species density and community structure at the dredging and disposal sites.

d. Short-term and potential long-term contamination of the disposal area by the possible introduction of marine sediments unfamiliar to the disposal area.

e. Temporary increase in turbidity at the dredging and disposal areas during construction.

f. Hazards of contamination of the marine environment beyond the limits of the defined disposal site.

Jonesport Harbor and the adjacent Maine coastline has supported commercial fishing activities for many years; however, the absence of adequate protection from the forces of nature has delayed development of the port's potential for fishing activities. The proposed project will be the incentive for further development within the area. Historic records substantiate damages to and destruction of fishing vessels caused by storm generated winds and waves and winter ice floes. The exposure of the Jonesport waterfront has precluded the construction of a municipal pier or public landing. Privately built wharves are in need of repair. Although the breakwater will not afford protection to these structures on the waterfront, it will allow for the construction of new facilities in protected waters.

Jonesport's location relative to highly productive fishing grounds indicates that construction of the suggested improvements will give Jonesport a very bright future and a strong economic base from which to grow and prosper. Larger draggers and trawlers will be able to safely dock and land their fish catch in a presently prohibitive area, since there is no way to land any volume of deepwater fish here now.

Aesthetics of the harbor will change with the appearance of the steel cell breakwater. It will be easily identifiable in contrast to the rocky forested coastline. However, local interests are willing to accept this situation because of the importance of the structure.

Economically, the project is of great importance to the area. On a dollar basis, the project will benefit the general public to the tune of almost one-half million dollars per year (see Table 2).

Jonesport is part of a Title IV (1) redevelopment area which is faced with a 20 percent rate of unemployment including skilled, semi-skilled and unskilled workers. Construction and subsequent maintenance of the project will employ a number of non-working individuals thereby favorably adding to the local wage base.

Other than submerged land occupied by the breakwater and easements on some lands at the shoreward end of the structure, to allow for construction and future maintenance of the breakwater, the project will not adversely affect land values. Experience has been that in addition to protecting vessels within harbors, breakwaters also afford protection to adjacent lands, which often results in greatly increased values of these lands.

The project requirements that local interests provide, maintain and operate a public landing in Sawyer Cove with adequate access roads, parking area and suitable related facilities have been met. The Maine State Department of Parks and Recreation with 80 percent funding from the Economic Development Administration has constructed a boat ramp, dock, slips and related landside facilities including a holding tank pump-out facility with proper sewage treatment at a total cost of \$337,000. The facility was completed in the spring of 1973; is owned, operated and maintained by the State and is open to all on an equal basis.

VII. EVALUATION. At a public meeting held in Jonesport, Maine on 4 April 1968, local interests requested that the Corps of Engineers, acting within legislative authority, construct a breakwater in Jonesport Harbor to form a protected mooring area. This meeting was attended by about 70 people representing Federal, State and local governments and agencies, commercial fishing interests and fishermen, local businessmen and other interested parties. Attendees were unanimous in their support for the requested improvement.

During the study period between 1968 and 1972, numerous contacts with interested parties resulted in continued showing of concern and need for harbor improvements. The U. S. Coast Guard reported that in 1972 they responded to 139 rescue cases in Jonesport Harbor, with 64 of these occurring during winter months. The Coast Guard has advised that the proposed project will considerably reduce their search and rescue activities in this area and at the same time, provide a much needed harbor of refuge during severe weather periods.

The analysis of fisheries resources was made with the cooperation of State of Maine Department of Marine Resources (previously called the Department of Sea and Shore Fisheries), the National Marine Fisheries Service (Department of Commerce), and the U. S. Fish and Wildlife Service (Department of the Interior). Given the fisheries resources that exist in these waters, the dealers and processors that are presently located at Jonesport, and a fleet of larger vessels capable of fishing the offshore resources, the future trend of Jonesport fish landings cannot help but increase by a very substantial degree. These additional annual landings are estimated to include 150,000 pounds of lobster, 640,000 pounds of shrimp, 900,000 pounds of cod, 100,000 pounds of flounder and 500,000 pounds of dogfish, 960,000 pounds of hake, and 195,000 pounds of scallops.

The locally requested 1,500-foot long breakwater adjacent to the main waterfront and the recommended breakwater in Sawyer Cove with access channel and anchorage area will both afford protection to vessels anchored behind these structures. Whereas the Sawyer Cove proposal will allow for anchoring the entire fishing fleet, a waterfront structure will accommodate less than half of this fleet. To provide sufficient area for the entire fleet, a waterfront structure would have to extend seaward a considerable distance, which would place it in 30-40 feet of water. This will add a great deal of cost to the structure.

Cost of a waterfront breakwater is offset by dredging an area within Sawyer Cove to accommodate the fishing fleet. In lieu of spending several millions of dollars to increase the size of a waterfront breakwater, it is necessary to spend only several hundred thousand dollars on dredging.

The recommended project was formally presented to interested parties at a public meeting held in Jonesport on 24 May 1972, attended by over 60 people. The project was favorably accepted by all present. In addition, many public and private organizations and agencies and other known interested parties were informed of the results of the study by the issuance of a public notice on 3 May 1972. No objections to the study findings have been recorded.

Federal and State agencies have expressed concern over proper disposal of the material to be dredged. However, these same agencies have offered their full cooperation in assisting the Corps to select the most appropriate area in which to effect disposal.

VIII. SUMMARY OF UNRESOLVED PROBLEMS. Only one unresolved problem has surfaced relative to the proposed improvements in Jonesport Harbor. That involves the disposal of 147,000 cubic yards of material to be dredged from the channel, anchorages and breakwater foundation areas. The U. S. Environmental Protection Agency, U. S. Fish and Wildlife Service, State of Maine Environmental Improvement Commission and State of Maine Department of Marine Resources have expressed concern with the affect open ocean disposal will have on water quality and fisheries resources. The Corps of Engineers shares this expressed concern.

IX. MITIGATION MEASURES. All appropriate means of mitigating adverse effects of disposing of the dredged material will be examined as a part of post-authorization studies. Included in these investigations will be:

a. The re-examination of lands adjacent to the project area that may be improved by use as a dredged material disposal area.

b. A determination of unacceptable adverse effect on municipal water supplies, shellfish beds and fishery areas, and wildlife or recreation areas.

c. A review of the latest technically available methods for transporting dredged material by pipeline, barge, or some other means to the disposal site to eliminate the indiscriminate or accidental discharge of material.

d. Coordination with State authorities to insure that project construction is consistent with the State's coastal zone management programs.

e. To identify designated marine sanctuaries and abide by regulations that control activities therein to preserve or to restore the conservation, recreational, ecological or aesthetic values of the sanctuary.

f. To evaluate adjacent wetlands and identify possible affects of the proposed work on these wetland areas.

g. To examine the use of most technically available dredging plant and other equipment capable of carrying out the construction program while performing within acceptable environmental limits.

Coordination will take place between the Corps of Engineers and pertinent Federal, State and local agencies and other interests during the post-authorization study phase of the project to insure that the requirements of the various agencies are met. Furthermore, any action required under existing or future laws, rules or regulations concerning the disposal of dredged material will be carried out. It is expected that, through working efforts by affected Federal and State agencies, the solution to dredged material disposal associated with the Jonesport Harbor project will be favorably resolved.

X. DETERMINATION OF NEED FOR REFORMULATION. The recommended plan of improvement, which for this project represents the environmental quality plan, has the approval of Federal, State and local agencies having the authority to exercise jurisdiction in these matters. There are understandable concerns about the satisfactory disposal of the 147,000 cubic yards of material to be dredged, however, it is anticipated that post-authorization studies and efforts will resolve the disposal problem to the satisfaction of all interested parties.

The project itself provides the most economically feasible method of fulfilling the requirements and needs of the commercial fishing fleet while producing the least adverse effects. Consequently, reformulation of the plan of improvement for Jonesport Harbor, Maine is considered unnecessary.

XI. DISPLAY OF RESULTS. The following two tables display the results of assessing and evaluating the project plans. Table I compares the significant impacts and contributions of the plans and Table 2 displays the current monetary costs and benefits of the plans in relation to the benefits and costs contained in the survey report.

TABLE I  
SUMMARY COMPARISON OF ALTERNATIVE PLANS

Jonesport Harbor, Maine

<u>A. SIGNIFICANT IMPACTS</u>	<u>RECOMMENDED/ ENVIRONMENTAL QUALITY PLANS</u>
Economic	Increase fishery resources Eliminate vessel damages Impacts realized on national as well as on local level.
Social	Increased short-term employment. Land easements required.
Environmental	Eliminate vessel damages. Probable short-term adverse effect on disposal area.
<u>B. PLAN EVALUATION</u>	
<u>1. Plan Data</u>	
Breakwater	1,200 feet long
Channel	6 feet deep x 100 feet wide
Anchorage	8 feet deep x 6 acres
Anchorage	6 feet deep x 9 acres
<u>2. National Economic Development</u>	
Beneficial	Reduced vessel damages. Increased fish landings. Short-term employment
Adverse	None
<u>3. Environmental Quality</u>	
Harbor improvements	Improved safety standards.
Water Quality	Meets State and Federal standards.
Coastal Zone	Land taking for breakwater.
Wetlands	No adverse impact.
Fishery Resources	Meets State and Federal requirements.

RECOMMENDED /  
ENVIRONMENTAL QUALITY PLANS

4. REGIONAL DEVELOPMENT

Project

Impetus for development of fishery  
related activities.

5. SOCIAL WELL BEING

Project Construction  
Future Maintenance  
Navigational Safety

Short-term employment  
Short-term employment  
Favorably affected

6. PLAN RESPONSE

Reversibility of plan  
Plan stability  
Plan effectiveness

Not reversible  
Periodic maintenance required  
Favorably effective

TABLE 2

UPDATED BENEFIT/COST COMPARISON  
Jonesport Harbor, Maine

	<u>RECOMMENDED PLAN</u>		<u>ENVIRONMENTAL QUALITY PLAN</u>
	<u>As Formulated</u>	<u>Using Current Values</u>	<u>Using Current Values</u>
Estimated Project Cost	\$3,560,000 (June 1972)	\$4,175,000 (Nov. 1974)	\$4,175,000 (Nov. 1974)
Interest Rate	5-1/2%	5-7/8%	5-7/8%
Period of Analysis	50 years	50 years	50 years
Plan Benefits (Annual)			
Increased Fish Catch	\$363,300	\$435,800	\$435,800
Reduction of Damages	16,600 ✓	16,600 ✓	16,600 ✓
Redevelopment	9,800	10,800	10,800
TOTAL	\$389,700 ✓	\$463,200	\$463,200
Plan Costs (Annual)			
Initial Construction Costs	\$210,300	\$260,300	\$260,300
Annual Maintenance	19,000	20,000	20,000
Aids to Navigation	200	500	500
TOTAL	\$229,500	\$280,800	\$280,800
B/C RATIO	1.70	1.65	1.65



DEPARTMENT OF THE ARMY  
Board of Engineers for Rivers and Harbors  
Washington, D. C. 20315

1 December 1972

PUBLIC ANNOUNCEMENT

JONESPORT HARBOR, MAINE

The Board of Engineers for Rivers and Harbors has considered the report of the Division Engineer, U. S. Army Engineer Division, New England, Waltham, Massachusetts, concerning the need and economic justification for providing a Federal navigation improvement with particular reference to a breakwater and anchorage at Jonesport Harbor, Maine.

The Board concurred in general in the views and recommendations of the Division Engineer and found the requirements of local cooperation to be generally appropriate. In reaching its conclusion, the Board took into account the objectives of enhancing the national and regional economic development, the quality of the total environment, and the well-being of the people of the United States in accordance with Section 209 of the Flood Control Act of 1970.

After carefully considering the environmental effects of the proposed navigation improvement, including those discussed in the Preliminary Draft Environmental Statement dated 11 August 1972, the Board concluded that the adverse environmental impacts would be minimal. It noted, however, that the final selection of a suitable disposal site for the dredged material has not been determined. However, the Board believed that the project should be authorized recognizing that the disposal area will be selected in cooperation with the appropriate Federal and State agencies.

The Board noted that the proposed anchorage is designed for the use and protection of the local fishing fleet and that no provisions are made for transient boat traffic and for refuge. It was of the opinion that the harbor facilities and public landing should be open to all, including transients, on equal terms and that adequate space to accommodate transient craft should be reserved within the harbor.

The Board noted that public use of the breakwater may be hazardous, and believed that access to the breakwater should be prevented by proper fencing and posting of signs, and that these measures should be constructed and maintained as a part of the Federal project.

(more)

## Jonesport Harbor, Maine

The Board noted that Washington County, in which the town of Jonesport is located, has been declared a Title IV (1) area of persistent and substantial unemployment by the Economic Development Administration. Since Jonesport depends almost entirely upon the fishing industry for its economic existence, an adequate harbor is necessary for the economic and social well-being of the community as well as for the safety of the fishing fleet. The Board believed that such a harbor is important to the area as a harbor of refuge and also to the economic stability of the community.

Accordingly, the Board recommended construction of harbor improvements at Jonesport, Maine, consisting of a steel sheet pile breakwater, 1,200 feet in length; a 15-acre anchorage composed of 9 acres, 6 feet deep, and 6 acres, 8 feet deep; and an entrance channel 100 feet wide and 8 feet deep; all generally in accordance with the plan of the Division Engineer and with such modifications thereof as in the discretion of the Chief of Engineers may be advisable, at an estimated cost to the United States, exclusive of aids to navigation, of \$3,285,000 for construction based on open-water disposal of dredged materials and \$213,700 annually for maintenance: Provided that, prior to construction, local interests agree to:

- a. Provide without cost to the United States all lands, easements, and rights-of-way required for construction and subsequent maintenance of the project and for aids to navigation upon the request of the Chief of Engineers, including suitable areas determined by the Chief of Engineers to be required in the general public interest for initial and subsequent disposal of spoil, and also necessary retaining dikes, bulkheads, and embankments therefor or the costs of such retaining works;
- b. Hold and save the United States free from damages that may result from the construction and maintenance of the project;
- c. Provide, maintain, and operate necessary mooring facilities and utilities including a public landing in Sawyer Cove with berthing depths alongside the landing commensurate with the entrance channel and including an adequate access road, parking area, and suitable related facilities open to all on equal terms, including transients;
- d. Accomplish without cost to the United States such utility or other relocations or alterations as necessary for project purposes;

Jonesport Harbor, Maine

e. Reserve spaces within the harbor adequate for the accommodation of transient craft;

f. Regulate the use, growth, and free development of the harbor facilities with the understanding that said facilities will be open to all on equal terms, including transients; and

g. Establish regulations prohibiting discharge of pollutants into the waters of Jonesport Harbor by users thereof, which regulations shall be in accordance with applicable laws or regulations of Federal, State, and local authorities responsible for pollution prevention and control.

The Board report is being processed to the Chief of Engineers, who in turn will transmit his proposed report, together with the reports of the Board and the reporting officers, to the Governor of the affected State and to interested Federal agencies for their views and comments. These comments will accompany the complete report to Congress with the recommendations of the Chief of Engineers.

After the report has been transmitted to Congress, further action toward construction of any project that may be recommended therein will depend upon authorization of the project by Congress and the subsequent appropriation of the necessary funds for the work proposed.

## SYLLABUS

The Division Engineer finds that Jonesport Harbor, Maine is worthy of improvement in the interest of protecting, maintaining and promoting the fishing industry. He finds also, that benefits to be obtained from provision of a sheltered anchorage are sufficient to warrant Federal participation in improvement. He recommends construction of an entrance channel 100 feet wide, 8 feet deep, leading from deep water in Moosabec Reach into Sawyer Cove; two anchorages within the cove of 9 acres, 6 feet deep and 6 acres, 8 feet deep, respectively; protected by a steel pile caisson type breakwater at the entrance to the cove, extending from Henry Point in a westerly direction for a total distance of 1,200 feet. The estimated first cost of construction is \$3,560,000 for the breakwater and anchorages including \$12,000 for aids to navigation.

The project is recommended subject to the requirement that local interests provide a public landing, including berthing depths at the landing commensurate to the channel depth. The landing would be open to all on equal terms. The annual maintenance cost for the breakwater and anchorage basin is estimated to be \$19,000 and \$200 additional annual maintenance for aids to navigation. The benefit cost ratio is 1.7.

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APPENDIX A Breakwater Design Criteria and Analysis

APPENDIX B Comments of Federal Agencies

APPENDIX C Letters of Comment by State and Local  
Authorities

ATTACHMENT 1 Information Senate Resolution 148

### MAPS ACCOMPANYING REPORT

PLATE NO. 1 General Map

PLATE NO. 2 Report Survey



DEPARTMENT OF THE ARMY  
NEW ENGLAND DIVISION, CORPS OF ENGINEERS  
424 TRAPELO ROAD  
WALTHAM, MASSACHUSETTS 02154

IN REPLY REFER TO:  
NEDED-R

31 August 1972

SUBJECT: Survey Report, Jonesport Harbor, Maine

HQDA (DAEN -CWP-D)  
WASH DC 20314

AUTHORITY

1. This report is submitted under authority of Section 304 of the River and Harbor Act, approved 27 October 1965, which contains the following item for a survey of Jonesport Harbor, Maine:

"The Secretary of the Army is hereby authorized and directed to cause surveys to be made at the following locations and subject to all applicable provisions of Section 110 of the River and Harbor Act of 1950:

Jonesport Harbor, Maine....."

2. The report was assigned to the New England Division by letter of the Chief of Engineers dated 10 November 1965.

PURPOSE AND EXTENT OF STUDY

3. The study was made to determine the need and economic justification for providing a Federal navigation improvement project, particularly a breakwater, at Jonesport Harbor. Detailed hydrographic, topographic and foundation surveys were made to determine the most practicable site, alignment and type of breakwater. With the aid of these surveys, detailed engineering studies were made. All available maps, charts, and photographs were utilized. A public hearing was held in Jonesport on 4 April 1968 to obtain information on specific desires of local interests. This information was supplemented by subsequent meetings with local officials and by field investigations to provide a basis for detailed economic studies.

## DESCRIPTION

4. Jonesport is located on the north side of Moosabec Reach in Washington County, Maine about 190 miles northeast of Portland, Maine and about 40 miles southwest of the Canadian border at Eastport, Maine. Jonesport Harbor is that part of Moosabec Reach, adjacent to the Jonesport mainland, extending from Kelley Point on the east to Hopkins Point on the west. Moosabec Reach extends from Chandler Bay westward to Western Bay between the mainland shore of Jonesport and a series of large islands, which includes Great Wass, Beal, and Norton Islands that define the south side of Moosabec Reach.

5. Jonesport Harbor extends along the shore about three miles east to west. Although much of the area immediately adjacent to the mainland is shallow, depths a short distance off the shore range from 20 to 40 feet, except for a bar at the eastern end of the Reach which has a dredged depth of 14 feet over a 300-foot width. The average depth in the six-mile long Reach is 25 feet. Sawyer Cove forms a partly sheltered natural anchorage about one-quarter mile east of the center of town and 3/4 mile west of Kelley Point. Depths in Sawyer Cove range from two to eight feet at mean low water.

6. Moosabec Reach is exposed to east and west winds, but is sheltered on the north by the mainland, and on the south by large islands. Tidal currents flood to the eastward and ebb to the westward attaining velocities up to four miles per hour. The mean tide range is 11.5 feet, the spring tide range is 13.2 feet, and extreme low tides fall 3.0 feet below mean low water. The east end of Moosabec Reach opens into the Gulf of Maine. Consequently, easterly and southeasterly storms cause the more severe wave conditions especially when running against a flooding tide. Wave heights approaching 8 feet have been observed along the center of the Reach and 5 to 7-foot waves have been experienced adjacent to the Jonesport shore.

7. Ice sheets form in coves and between sheltered portions of the islands during the winter months. These sheets break up with successive changes in the tide. Chunks of ice move into the Reach

on ebb tide. Winds from the southwest and southeast blow the ice toward the Jonesport side causing severe damage to boats moored along the shoreline. Northeasters cause the ice to move against the Beals Island shorefront forcing boats moored at Perio Point and the north side of Beals Island to seek temporary shelter in Beals Harbor and other nearby coves.

8. The locality is shown on U. S. Coast and Geodetic Survey Charts Nos. 304 and 1201, U. S. Geological Survey Map entitled "Jonesport Quadrangle", and on maps contained in this report.

#### TRIBUTARY AREA

9. The area immediately tributary to Jonesport Harbor is the town of Jonesport, Washington County. In the 10-year period 1960-1970, the population of Jonesport decreased 11 percent from 1,486 to 1,337. Washington County has been declared a Title IV (1) area of persistent and substantial unemployment by the Economic Development Administration. Although the town derives some income from seasonal visitors, the principal means of livelihood is commercial fishing with its associated activities. Lobster, herring, scallops, shrimp and hake comprise the catch made by the local fleet. There are 12 fishing companies and three boat-building firms in Jonesport. Peat moss is harvested from local bogs for shipment throughout the country. The town's only link with land transportation is via State Highway Route 137. There is no railroad, airline or ferry service within the town. However, there is a railroad freight terminal located at Columbia Falls, sixteen miles northwest of Jonesport.

#### BRIDGES AFFECTING NAVIGATION

10. A fixed span, high level, highway bridge joining Beals Island to the mainland at West Jonesport is the only bridge in the vicinity of the waterway under study. This bridge crosses Moosabec Reach at the site of the old state ferry landing. Plans for the bridge were approved by the Secretary of the Army on 2 July 1956 and construction was completed in September 1958. The bridge is owned by the State of Maine Highway Commission. The bridge structure would not interfere with plans for improvement of the waterway, therefore, no alterations are considered necessary.



## EXISTING CORPS OF ENGINEERS' PROJECT

11. There is no existing Federal project at Jonesport Harbor. There have been no prior reports made for the harbor. However, there are three existing Federal navigation projects in the general vicinity. An existing project is located at the east end of Moosabec Reach which provides for a channel 14 feet deep and not less than 300 feet wide through the approach bar, removal of ledges obstructing the channel and the construction of a small breakwater at Nova Rocks. This project was completed in 1899 at a total cost of \$114,000. Maintenance costs to date amount to \$14,982. In 1916, interest in further improvement led to an unfavorable report published in House Document No. 995, 64th Congress, 1st Session. No further requests for Federal improvement have been initiated since 1916.

12. Beals Harbor, located on the northern side of Beals Island opposite Jonesport, contains a Federal project adopted in 1948, which provides for an anchorage 10 feet deep over an area 600 feet long and varying in width from 1,000 feet at the 10-foot depth curve to 600 feet at the inner end. The project was completed in November 1957 at a cost of \$184,800. Maintenance costs for the project during the 15 years since it was completed have amounted to \$1,762.

13. A third Federal navigation project in the vicinity of Jonesport is located on the south side of Pig Island, one of the islands forming the south boundary of Moosabec Reach. This project provides for a channel 80 feet wide, 6 feet deep, from Eastern Bay to Alley Bay through Pig Island Gut and an anchorage of 5.5 acres, 6 feet deep within the Gut. This project was completed in October 1965, at a cost of \$191,753. Total maintenance costs to date amount to \$994.

14. The town of Beals furnished spoil areas for construction of the Beals Harbor project. The town of Beals also provided a public landing at Pig Island at a cost of \$5,000. No improvements for general navigation, other than construction of wharves by local interests, have been made at Jonesport.

## TERMINAL AND TRANSFER FACILITIES

15. Jonesport has no public landing. A State-owned ferry terminal was located at the site of the Beals Island bridge, but was removed when the bridge was constructed in 1958. There are approximately 13 privately-owned wharves in Jonesport, all of wood pile construction. All but one are used to land catches by local fishermen. The Jonesport shoreline is so steep and rocky that landing floats cannot be readily stored on shore above high water during the winter, therefore, their use is limited. Instead, access ladders are fastened to the piling, on the face of the wharves. All fishing gear, bait and catches are hand-carried over the ladders or swung onto the wharves by A-frame with block and tackle during low tide stages.

16. The O.W. & B.S. Look Co., Inc. Marine Terminal is used for the receipt of approximately 3 million gallons of petroleum products annually. The products are brought to the terminal by coastal tankers averaging 10 trips per year. From the terminal they are distributed throughout Washington and Hancock Counties by truck. The terminal also supplies fuel for the local fishing fleets of Jonesport and Beals Island.

## IMPROVEMENTS DESIRED

17. At a public hearing held in Jonesport on 4 April 1968 a spokesman for the Harbor Improvement Committee requested consideration be given to two sites for construction of a breakwater-pier which would provide a safe mooring area for commercial fishermen operating from Jonesport. Local interests preferred that a breakwater-pier be built extending southwesterly from Henry Point at the entrance to Sawyer Cove forming a protected anchorage within the cove. It was requested that the breakwater be topped with a suitable hard surface to accommodate trucks to facilitate the loading and unloading of the fishing boats, alongside the structure. The alternate plan desired would provide an L-shaped breakwater-pier extending southerly from the Jonesport shoreline from a point approximately 2,000 feet east of the Jonesport Beals Island bridge and thence running generally in a westerly direction for a total distance of approximately 1,200 feet forming a protected harbor with a maximum water depth of 20 feet behind the breakwater.

18. Local interests claim that construction of a breakwater-pier would provide them with a public landing which could lead to the expansion of the local economy. As previously mentioned, Jonesport has no municipal pier or public landing. Most wharves are in need of repair. There is no place where one could walk down a ramp or stairs to a float and board a boat.

## COMMERCE

19. Total waterborne commerce reported at Jonesport Harbor over the past 5 years averages 13,500 tons annually. Receipt of home heating fuel oil, kerosene and gasoline comprise approximately 70 percent of the commerce at Jonesport. No increase in the traffic of petroleum products is expected to result from construction of a breakwater and anchorage. The remaining 30 percent of the commerce involves fish products. The U.S. Fish and Wildlife Service and the Maine Sea and Shore Fisheries report that Jonesport Harbor is an active fishing port with lobster, herring, shrimp, hake and scallops comprising the bulk of commercial landings. A total of 1,498,000 pounds of lobsters were landed in Jonesport in 1970. Approximately 5,000,000 pounds of herring valued at \$100,000 are landed at Jonesport for processing. Five trawlers work out of Jonesport fishing for either scallops, shrimp or hake depending upon the season. In 1970, these boats landed about 14,800 pounds of scallops from the local fishing grounds worth \$20,000; 374,000 pounds of shrimp worth \$74,800; and 31,000 pounds of hake valued at \$990. In addition, relatively small amounts of crabs, clams, periwinkles and sea worms are landed at Jonesport. The projected landings for these fisheries are discussed under "Estimate of Annual Benefits".

## VESSEL TRAFFIC

20. The number of boats presently based at Jonesport are shown in TABLE I below. Information on the future fleet is contained in the Section "Estimate of Annual Benefits".

TABLE I

<u>Type of Craft</u>	<u>Number of Boats</u>	<u>Length</u>	<u>Draft</u>	<u>Present Value</u>
Carrier	2	55'-65'	5'-7.5'	\$ 50,000
Trawler	5	34'-45'	3' 4'	60,000
Seiner	2	40'-42'	3'-4'	30,000
Lobster	50	26'-40'	2-3.5'	522,000

Vessel trips reported by Jonesport fishermen average 245 trips per year. There are only a few recreational boats berthed in the Jonesport Harbor area.

21. A recent Jonesport town tax report listed 87 lobster boats licensed to use the harbor as a home port. Field reconnaissance made during the course of the study indicated that many of the boats listed on the tax record were not operating. Local fishermen report that the actual number of active boats were 2 carriers, 3 or 4 draggers and 30 to 40 lobster boats. To verify this information, a boat count was made in July 1969 while the lobster fishing fleet was idle during the shedding season. The count revealed five trawlers, two carriers, 2 seiners and 50 lobster boats at moorings or beached in Jonesport and West Jonesport.

#### DIFFICULTIES ATTENDING NAVIGATION

22. With the exception of Sawyer Cove, the entire shoreline along the Jonesport waterfront offers no adequately sheltered mooring area for the local fishing fleet, particularly during easterly and southeasterly storms. Boats and lobster cars break their moorings and are blown onto the rocky coast. Severe damage is sustained during the winter from ice packs drifting through Moosabec Reach. Planks on the boats are so badly chewed by the ice that some boats have to be hauled for repairs. There have been several instances where ice floes have carried boats away, necessitating rescue by a U.S. Coast Guard icebreaker. It is difficult and at times impossible to land fish or other cargo during rough weather, due to the exposed location of the harbor. This exposure has discouraged local interests from developing any adequate terminal from which the fishermen can operate.

## PLAN FORMULATION

23. The provision of breakwaters at the two sites requested at the public hearing were studied in detail. In addition, all other possible sites along the Jonesport shorefront were examined. All sites, except the two requested, were quickly ruled out for various reasons, primarily because of economics and lack of available area for protection. A breakwater just east of the Beals Island bridge, as desired, would provide protection from ice floes moving through Moosabec Reach. However, to provide a sheltered anchorage which could accommodate all of the Jonesport fishing fleet, a breakwater would have to extend southerly from the shore well out into deep water and then extend westerly in an average water depth of 20 feet (See Plate 1). A rubble mound breakwater with a total length of 1,500 feet would be required at this location. This breakwater would inclose an area of about 7 acres. The number of boats that would have to be accommodated at any one time would total approximately 63 boats, including 4 additional new boats in the 60-foot length class. The mean tide range at Jonesport is 11.5 feet. Depths in this anchorage would range from 6 to 15 feet. These combined depths would allow four boats per acre of all types using single bow mooring line methods. As a result, only 28 of the 63 boats could be accommodated. The cost of construction for the 1,500-foot long rubble mound breakwater would amount to over \$6,300,000. It was found that the annual charges for the first cost would greatly exceed anticipated annual benefits, and not all of the boats needing protection could be accommodated unless they were rafted together during extreme weather conditions, a hazardous practice. All types of breakwaters were considered for this site, but with similar findings.

24. The remainder of the shoreline from West Jonesport to Kelley Point, other than Sawyer Cove, is similar to that just discussed, i. e., it drops off sharply into deep water and the entire shoreline is exposed to ice floes moving parallel to the shore. Consequently, either very long breakwaters near the shore or very massive breakwaters constructed in deep water offshore would be necessary to provide an anchorage area of sufficient size to meet the needs of protecting the entire fleet. These considered breakwater sites are not economically feasible.

25. Sawyer Cove is the only area which offers some natural protection from storm waves and ice floes. The cove is large enough to meet present and future anchorage requirements. Henry Point protects a portion of the cove from the most severe storms, those emanating from the easterly quadrant. The cove extends northerly from Moosabec Reach sufficiently to prevent ice floes, moving with tidal currents in the Reach, from penetrating to any extent into the interior of the cove.

26. The shoreline of Sawyer Cove is chiefly composed of bed-rock outcrops. Several outcrops protrude above mean low water near the center and along the shore. In order to avoid these ledges and still provide a dredged anchorage of sufficient size to accommodate all craft expected to use the improvement, it would be necessary to provide a breakwater extending from Henry Point.

27. Hydrographic surveys of the area revealed a submerged spit, extending eastward from Old House Point across the entrance to Sawyer Cove. Outside the spit the bottom falls off sharply to a depth of 40 feet, while inside the depth averages about 7 feet. By locating one leg of a breakwater on this spit, the breakwater height would be minimized while the potential anchorage area inside the cove is maximized. In order to protect the area from storm waves approaching through the Reach from the east, a breakwater must be connected by a second leg to Henry Point.

28. The size of the anchorage basin and the length of the breakwater is based on the size of the fleet requiring protection. The U.S. Fish and Wildlife Service has stated that no new lobster boats would be added to the fleet following harbor improvement. However, there would be 4 new trawlers in the 60-foot class added to the Jonesport fleet. Consequently, future needed anchorage capacity is for 50 lobster boats, plus 13 carriers, trawlers and seiners. Using an average length of 30 feet for the lobster boats, a 13.5-foot spring tide range, a 6-foot deep anchorage requirement, and the free overlapping circle method of mooring, results in an anchorage capacity of 5.5 boats per acre. Thus all 50 lobster boats could be accommodated in 9 acres of anchorage.

29. The 13 deeper draft fishing vessels averaging 60 feet in length and moored in an 8-foot anchorage depth would have an anchorage

capacity of 3.5 boats per acre. On this basis, the total anchorage area required in Sawyer Cove would be 15 acres. A ledge outcrop located in the center of the cove 700 feet inside the entrance limits the location of the anchorage. To reach the anchorage area from deep water in Moosabec Reach, it would be necessary to dredge a channel through the bar at the entrance to Sawyer Cove.

30. Two sites were considered within Sawyer Cove for the 15-acre anchorage. One site was as far inside the cove as physically possible to obtain maximum protection from the surrounding land mass. Provision of an anchorage at this site would still require a breakwater at the entrance to Sawyer Cove 1,000 feet long to provide full protection. The second site for the anchorage was in the relatively deep water between the entrance bar and the first ledge outcrop. Protection of this site would require a 1,200 foot long breakwater located on the entrance bar. A comparison of the costs for providing the anchorage at these two sites was made and the seaward location was found to be much less costly. The inner anchorage would involve a high cost for removal of ledge areas and an extensive quantity of ordinary materials from shoal areas. The high costs for the inner anchorage were greater than the cost of the additional 200 feet of breakwater necessitated for the entrance site. Also, location of the anchorage closer to the entrance would leave room for future expansion of the anchorage should the need arise.

31. A tentative plan of improvement consisting of a rubble mound breakwater at the entrance to Sawyer Cove and a 15-acre anchorage area in the cove was presented to local interests at a meeting in Jonesport on 19 November 1970. The purpose of the meeting was to obtain local approval of the proposed improvement site prior to making further necessary foundation surveys. They found the plan acceptable. Town officials stated that they had met with State officials and representatives of the Economic Development Administration of the U.S. Department of Commerce and succeeded in getting approval of a Federal grant of \$228,000 to construct a public landing independent of a breakwater. The site chosen for the landing was on the northwest side of Sawyer Cove. Design and construction of the landing would be under the supervision of the State Park and Recreation Commission, since this State agency was found to be the only one with capability of providing the necessary work functions. Construction of the landing is presently scheduled to begin in late 1972.

32. Local interests gave informal approval of the plan and stated that they propose to go ahead with plans to construct the public landing, independent of the breakwater and anchorage proposal. Local interests were informed at the meeting that before a final design of the breakwater could be made, additional probings and borings would be necessary along the chosen alignment, as preliminary probings indicated poor foundation conditions.

33. Probings and a boring taken in January 1971 along the alignment of the considered breakwater site at the entrance to the cove revealed unsuitable foundation conditions for the conventional design of a rubble mound breakwater. A design for a wide berm rubble mound breakwater was then considered which could be constructed for these conditions. This design would require excavation of mud to a depth of 21 feet below mean low water followed by replacement by sand and a stone base with stone berms extending 100 feet on each side of the center line to support the main breakwater structure. The cost of this construction was estimated to be \$5,300,000. Preliminary benefits to be derived from the improvement when compared to the costs resulted in a benefit-cost ratio of 0.53 to 1.0.

34. Two alternate designs were considered; (a) double row walls of steel sheet piling and (b) cellular cofferdams. Both designs were consistent with known foundation conditions. Only the cellular cofferdam design appeared worthy of detailed study. To provide a stable foundation, trench excavation of the existing bottom to a depth of 25 feet below mean low water, 75 feet wide at the bottom of the trench, would be necessary, followed by replacement of the dredged material with coarse sand and gravel. Steel sheet piling could then be driven to a minimum depth of 10 feet in the sand foundation. The cells would be 30 feet in diameter connected together by sheet pile diaphragms. The cells and connecting diaphragms would be filled with sand and gravel for stabilization against wave action and capped with cover stone to protect the structure from overtopping. This design was considered in detail and is discussed below under "Plan of Improvement".

#### PLAN OF IMPROVEMENT

35. The most feasible and economical plan of improvement would consist of an entrance channel 100 feet wide and 8 feet deep leading from deep water in Moosabec Reach into Sawyer Cove; two



anchorage within the cove of 9 acres, 6 feet deep and 6 acres, 8 feet deep, respectively protected by a cellular steel pile breakwater extending from Henry Point southwest for a distance of 650 feet, then west across the entrance to Sawyer Cove, an additional distance of 550 feet. This location takes advantage of a ridge at the entrance which would minimize the amount of steel required for construction. Wave diffraction and refraction studies indicated that this alignment of the 1,200-foot long breakwater would provide maximum effectiveness in overall protection of the cove against storm waves entering Moosabec Reach from the east or southeast. Waves would be reduced to a height of less than 2 feet in the anchorages under storm conditions. Waves of this magnitude are tolerable for the type and size of craft that would use the anchorages.

36. Design of the breakwater is based on a significant wave height of 5 feet and a spring tide stillwater level of 13.2 feet above mean low water. The typical section of the breakwater should be as follows:

- a. Top elevation of 18 feet above mean low water to prevent damaging overtopping by wave runoff;
- b. Each cell would be 30 feet in diameter filled with sand to elevation + 15 m.l.w. and capped with 3 feet of cover stone;
- c. Thirty-four cells with connecting diaphragms would be required to extend a distance of 1,200 feet from Henry Point.

This plan provides the minimum structural features necessary to provide adequate protection for the existing and prospective fishing fleets, while maximizing net benefits.

#### SHORELINE CHANGES

37. The considered plan of improvement would have no adverse effect on the adjacent shoreline as the entire area is surrounded by ledge outcrops.

#### REQUIRED AIDS TO NAVIGATION

38. The United States Coast Guard has been consulted in regard

to establishing aids to navigation for the improvements under consideration. They have reported that the proposed improvement would require a single pole light at the outer end of the breakwater. The cost of installation is estimated at \$12,000 with an annual maintenance cost estimated at \$200.

#### ESTIMATE OF FIRST COST

39. An estimate of first cost has been prepared for the selected plan of improvement. The estimate for dredging the anchorage areas, entrance channel and the trench under the considered breakwater is based on soundings, probings and a boring taken during and subsequent to a hydrographic survey made in August and September 1968. Federal construction under the considered plan would involve the removal of mud, sand and organic material by bucket dredge with disposal of the material in an approved off-shore spoil area. Dredging quantities are based on in-place measurements and provide for removal to project depths below mean low water plus an allowance of one foot overdepth. Side slopes were estimated to be one vertical to three horizontal.

40. The considered breakwater would be constructed of 2,316 tons of steel sheet piling formed in cells and connecting diaphragms. The cells would have a diameter of 30 feet, and a top elevation of 18 feet above mean low water. To provide a suitable foundation, a trench would be hydraulically excavated and backfilled with sand. The steel piles would then be driven approximately 10 feet into the prepared foundation material. The caisson would be filled for stability with 25,700 cubic yards of sand and gravel and the entire structure would be capped with a 3-foot thick layer of stone. Cost estimates are based on prices prevailing in June 1972. The U.S. Coast Guard would provide the necessary navigation aids. The estimated cost for the 1,200-foot long breakwater and the dredging of the entrance channel and anchorages, including an allowance for contingencies, engineering, design, supervision and administration, is shown below:

# PROJECT COST ESTIMATE

<u>Cost Acct. Number</u>	<u>Item</u>	<u>Amount</u>
09	<u>Dredging (ordinary materials)</u> Quantity 57, 000 c.y. Unit price \$4.00	\$ 228, 000
	Contingencies	<u>34, 200</u>
	Total Dredging Cost	\$ 262, 200
10	Steel pile caisson breakwater 1, 200 feet long	
	Excavation 90, 000 c.y. @ \$4.00/c.y.	360, 000
	Sand backfill 90, 000 c.y. @ \$6.15 /c.y.	553, 500
	Sheet steel pile cells 144, 800 s.f. @ \$8.50/s.f.	1, 230, 800
	Sandfill 25, 700 c.y. @ \$7.60/c.y.	195, 300
	Stone cap 7, 100 tons @ \$12.50/ton	88, 800
	Contingencies	<u>485, 700</u>
	Total Breakwater Cost	\$ 2, 914, 100
30	Engineering and Design	147, 000*
31	Supervision & Administration	<u>225, 000</u>
	Total Construction Cost	\$ 3, 548, 300
	Aids to Navigation	<u>12, 000</u>
	Total Project Cost (SAY)	\$ 3, 560, 000

\* Excludes preauthorization study cost of \$40,000.

41. Cellular steel sheet pile structures require little maintenance. Corrosive action is the principal disadvantage in sea water. In order to provide for a full project life expectancy of 50 years, a high carbon, high strength sheet steel pile resistant to corrosion would be used. The caissons would also be protected by plastic coating and cathodic protection with a view to extending the project life and reducing the economic cost of the project.

## ESTIMATE OF ANNUAL CHARGES

42. The estimated annual charges for the considered improvement are based on an anticipated project life of 50 years at an interest rate of 5 1/2 percent. Maintenance cost are based on an average annual shoaling rate of 1,500 cubic yards in the anchorage and channel. Average annual maintenance charges for breakwater repairs are based on the need for replacing the steel protective devices as shown by experience with other steel pile structures exposed to similar conditions. The computation of annual charges is detailed below:

Interest & Amortization:	
(0.05906 x \$3,560,000)	\$210,300
Maintenance:	
Dredging 1,500 c.y. @ \$6.00	9,000
Breakwater	10,000
Aids to navigation	200
Total Annual Charges	<hr/> \$ 229,500

## ESTIMATE OF BENEFITS

43. Provision of a breakwater at the entrance to Sawyer Cove and a sheltered anchorage within the cove would result in considerable benefits to fishermen at Jonesport Harbor. These benefits would accrue primarily from increased fishing time gained by elimination of delays in landing the catch at Jonesport, providing new markets for the fishing resource, reduction in the cost of mooring maintenance, and reduction or elimination of damages to vessels caused by rough weather and ice floes. The following is based on data from the U.S. Fish and Wildlife Service (See APPENDIX B).

44. Currently, lobster fishermen are inconvenienced by having to drag their skiffs a considerable distance over mudflats at low tide to get to their boats. In the lobster fleet, 26 boats not used for fishing during the winter months are actively engaged in fishing about 200 days a year. The 200 days are based on time lost due to breakdowns holidays, weekends, and weather. The remaining 24 boats that are active year-round, fish about 250 days per year. Since an estimated one hour per day is spent getting to and from the fishing boats, approximately 11,200 man-hours per year are devoted to this non-productive activity.

## ESTIMATE OF ANNUAL BENEFITS

43. It is difficult to find a single community along Maine's coastline that is more committed to the sea for its livelihood than Jonesport. Ninety percent of the adult population derive a living from the fishing industry. In fact, the fishing industry along with closely allied activities is the only industry in Jonesport, and therefore the citizens are almost totally dependent on it. Jonesport Harbor is the only commercial fishing harbor east of Frenchman Bay, about 30 miles to the west; and west of Machias Bay, about 20 miles to the east. Commercial harbor facilities and fish landings at the latter site are small compared to those at Jonesport. The next commercial fishing harbor to the east of Machias Bay is at Eastport near the Canadian border. Thus, Jonesport Harbor is the only harbor along much of the "downeast" coast within safe and reasonable running distance from the fishing grounds.

43a. Exposed as it is to the open sea, Jonesport has a long and historic record of damage and destruction to its fishing fleet. Moosabec Reach, running in a east-west direction, offers little protection from the east and southeast winds that frequently lash the shorefront of Jonesport. Storm-generated waves sweeping the length of the waterfront cause boats to strain at their moorings, tearing some craft loose and driving them aground or into collision with boats moored close by.

43b. Additional damage is inflicted by floating ice during the winter months. Boats moored in the open water of Moosabec Reach constitute targets for chunks of ice carried first one way and then the other by the ebb and flood of the tide. A U. S. Coast Guard ice breaker vessel is consistently needed to free fishing craft from ice-caused problems.

43c. There is no safe mooring in Jonesport in a storm. Tide currents flow east during flood and west during ebb with a maximum velocity of more than four miles per hour. With boats moored in the open reach as at present, and with ice in the tide waters constantly moving first one way and then the other, very substantial annual damages occur to the boats.

43d. Such exposed conditions preclude the provision of a municipal pier or public landing. Most shorefront wharves are in need of repair.

There is no place where one may walk down a ramp or flight of stairs to a float and board a boat. This is done by descending a 20-foot ladder, hand over hand. This is a hazardous practice. Access to the fishing boats is then via small skiffs, also a very dangerous maneuver under the exposed conditions of the reach.

43e. There are numerous terminal facilities located in the Jonesport area involved in the fishing industry. They include a cannery; several lobster pounds; three boat building and repair yards; and companies involved in receiving, packing, and shipping such fish products as lobsters, scallops, crabs, clams, herring, periwinkles, shrimp, hake, sea worms, and fish produce.

43f. Providing a protected harbor at a single locale along the Jonesport waterfront would result in reduced boat and lobster car damages from waves and ice, or allow more fishing time for the existing fleet through reduced lost days; and encourage expansion of the fleet. Larger vessels would be brought in to the area because of the protected harbor facilities and would land greater amounts of the fish species presently being landed as well as landing a variety of other underutilized species for which markets exist. Of course, a benefit would result to the region through temporary increased employment created by the project, as the region is classified a depressed area. The only hope of expanding the economy of the area is by taking advantage of every opportunity offered by the ocean and its products.

43g. Before an analysis of the specific benefits can be presented, some information should be provided concerning (a) trends of Jonesport fish-catch landings (b) capability of the fishing grounds to sustain the expected yield, and (c) an analysis of future market demands. As regards (a), data on past landing of fish are presented in a previous section of this report. However, the commercial fisheries experts of Federal and State agencies dealing with fisheries on an everyday basis, emphasize that such data are of little value in attempting to calculate projections for the future since these figures are based on a variety of conditions that may have existed in the past but which may not exist in the future. The agencies referred to are the Department of Sea and Shore Fisheries of the State of Maine, the National Marine Fisheries Service of the Department of Commerce, and the U. S. Fish and Wildlife Service of the Department of Interior. Data on past landings do not

necessarily reflect conditions that may exist in the future. Fisheries along the coast are very dynamic and changeable. Temperature changes of the waters up or down can affect the fisheries substantially. Thus, hindcast and present day statistics concerning landings may not reflect conditions that would exist if a harbor improvement were provided at Jonesport. Also, such figures could have little relationship to the size and availability of the resource that is to be harvested.

43h. It should be noted that Jonesport is favorably located within relatively short distances of very productive fishing grounds. In the past however, because of its inadequate harbor facilities, Jonesport has been chiefly a lobster port and its present fleet is made up mostly of lobster boats. There is no location at present where draggers or trawlers in the 45 to 85-foot class can land their catches and be protected from bad weather. In fact, there are only two all-tide wharves in the town that can now be used under even the most favorable conditions. Thus, there is no way to land any volume of deepwater fish at Jonesport, since these fish must be harvested by larger draggers and trawlers.

43i. In short, given the fisheries resources that exist in this area, given the dealers and processors that are presently located at Jonesport, and given a fleet of larger vessels capable of fishing the offshore resources -- a fleet which would come into existence once the proposed harbor improvement is accomplished -- the future trend of Jonesport fish-catch landings cannot help but be upward, and by a very substantial degree.

43j. Concerning (b), the capability of the fishing grounds, our fisheries experts state that it is impossible to document with absolute precision and accuracy the capability of the fishing grounds in the Jonesport area and in the neighboring Bay of Fundy to sustain the expected yield. Nevertheless, based on the experience and knowledge of Jonesport fishermen and the findings of marine research personnel of the Maine Department of Sea and Shore Fisheries, it appears that the projected landings figures for all species, as presented later in this report, are realistic. In most instances, such projected landings are definitely on the conservative side and may well be exceeded, once the project is completed. At present, relatively little dragging

is being done for the various species of groundfish in the areas available to Jonesport fishermen, including the Bay of Fundy. Thus, there is no evidence of over-fishing on any of the available stocks.

43k. A few words about future market demands, (c). As far as underutilized species are concerned, obviously there is no way to point to past performances in this area, otherwise they would not be considered "underutilized". There are, however, many factors that indicate that the markets for all seafood products have never been better. Prices for all seafoods have reached record highs, both domestically and in a number of foreign countries. The demand for seafoods in the United States has increased steadily, as may be seen from the tremendous growth in seafood imports. The Maine Department of Sea and Shore Fisheries, through its marketing Division, regularly furnishes the Maine commercial fishing industry with marketing leads for all species, and it has found that in the past two years the demand in both domestic and foreign markets has far exceeded the available supply.

43l. Jonesport producers and processors indicate that there are extremely favorable market conditions for their products. Their chief concern is the creation of better harbor facilities so that production of all species can be increased. Specific examples of such market conditions have been furnished by Jonesport firms. In one instance, 18,000 pounds of flounder were recently trucked to a buyer in Norfolk, Virginia at a very favorable price. The customer has indicated he would like at least 80,000 pounds a week, the year around, if the product were available. This one customer therefore, would provide an outlet for some four million pounds of product a year.

43m. In another instance, a Canadian market has recently been discovered for crabs with a customer willing to pay \$.32 a pound. There is an excellent crab resource in the Jonesport area which has not been developed, since it was believed that the crabs were of relatively little value. But it now appears that a local crab fishery would represent an additional benefit to be computed under underutilized species. At present there is no way to estimate the full potential of this fishery.



43n. Both pollock and hake have good markets in the South, Jonesport firms report. To take advantage of these markets, the main consideration is volume production, which would be possible with the proposed harbor improvement.

43o. A Jonesport firm also reports that it has a single order for 185,000 pounds of smoked herring, and that it hopes to be in a position to handle at least 300,000 pounds in the future. At present, however, all of its raw material must be trucked from Canada, so that all of its current production is based on foreign fish. With the proposed new harbor facility, it would be possible to meet these market demands with domestically-harvested fish landed by Jonesport fishermen operating out of larger vessels that can now be based there.

43p. The following paragraphs present an analysis of specific fisheries to be benefitted as a result of the breakwater-anchorage improvement proposed.

44. Currently, lobster fishermen are inconvenienced by having to drag their skiffs a considerable distance over mudflats at low tide to get to their boats. In the lobster fleet, 26 boats not used for fishing during the winter months are actively engaged in fishing about 200 days a year. The 200 days are based on time lost due to breakdowns, holidays, weekends, and weather. The remaining 24 boats that are active year-round, fish about 250 days per year. Since an estimated one hour per day is spent getting to and from the fishing boats, approximately 11,200 manhours per year are devoted to this non-productive activity.

44a. Because of the exposed location of Jonesport Harbor, lobstering time is lost between March 1 and December 31 due to rough harbor conditions. An average of 30 fishing days is lost each year when the harbor is too rough for lobstermen to row out to their boats to transfer gear and bait. It is estimated that 10 of the 30 days will be so rough that lobstering would be impossible even if the proposed project were constructed. An estimated 1,000 fishing days are lost annually which is directly attributed to inadequate harbor protection.

44b. Lobstering is the major type of fishing activity in Jonesport. The 50 boats actively operating deliver a total of 1,498,000 pounds valued at \$1,498,000 annually. Elimination of delays caused by rough weather, tidal range, and ice conditions would result in an additional 20 days of fishing time during which they could catch an additional 150,000 pounds valued at \$150,000. This increase amounts to only about 10-percent of the present annual landings and is a realistic and probably conservative figure. From the best evidence available from local fishermen and from marine scientists of the National Marine Fisheries Service and the Maine Department of Sea and Shore Fisheries, there is reason to believe that the lobster resource in the Jonesport area will sustain such a moderate increase in production.

44c. It should be pointed out that the lobster benefits are based on the conditions existing for the specific resource in the Jonesport area, not for the entire lobster resource of the State. While the lobster resource in the western part of Maine does appear to be fished to capacity at present, there are indications that a limited increase in production of possibly 10-percent is both possible and probable in the Jonesport area, if the fishermen were able to operate under more favorable conditions. Also, fishing effort in the western part of the State is much heavier than "downeast".

44d. As the lobster fishermen would be extending their productive time in existing vessels, the only additional costs would be operating costs such as fuel, labor, extra traps, line and bait. These additional costs, needed to obtain the 150,000 pounds of lobster, are estimated to be 20-percent of the gross value of the catch. Therefore, the immediate net annual benefit to the lobstering industry would be \$120,000.

45. A protected mooring area and access to public landing facilities are expected to stimulate new markets for large herring which are processed as smoked herring and bloaters. Actually, new markets already exist for large herring, as noted above. In addition to the above information, excellent markets exist in West Germany for fresh herring fillets, while herring roe is an item in great demand in Japan.

Local firms report that the domestic market for smoked herring products is remarkable and that the current demand far exceeds what can be produced, even utilizing imported fish. According to the latest data available, domestic production at present can barely meet 20-percent of the domestic market demand.

45a. Two smoke houses now exist at Jonesport that are prepared to process large quantities of large herring. If a much greater volume of raw material can be produced locally, these facilities will doubtless be expanded further. But development of this industry to anything like its full potential depends entirely on completion of the proposed harbor improvement. It is expected that the potential markets and the improvement will provide an immediate demand for an additional 150,000 pound catch, valued at \$45,000 annually, to be landed by the existing fleet. Using similar reasoning for additional costs as stated for the increased lobster catch, i.e. 20-percent of the ex-vessel value of the catch is for operating expenses, the net annual benefit would amount to \$36,000.

46. Because of the estimated potential of the shrimp and hake resources in the Jonesport area, it has been estimated that at least four draggers or trawlers would be added to the local fleet, once the proposed project is completed. Members of the Jonesport commercial fishing industry, in fact, state that at least six or seven such draggers would shortly be fishing for hake and flounder alone. Recent experience in Maine's commercial fisheries has shown that, where a harvestable resource exists, together with shore facilities and an adequate harbor, many new vessels are attracted within a very short time. A prime example is the spectacular growth during the past five years of the Maine shrimp fishing fleet in various harbors in the western part of the State. The fisheries experts do not doubt that the same rapid growth of the local fleet will take place at Jonesport, with harbor improvements.

46a. Four new trawlers in the 60-foot class would land 640,000 pounds of shrimp annually valued at \$128,000 and 960,000 pounds of hake worth \$86,400. It is estimated that the cost of investment in trawlers and their necessary equipment to provide the new additions to the fishing fleet would amount to 60-percent of the ex-vessel value of the catch. After application of the equivalent average annual factor to

discount the benefits which will accrue along an accelerated growth curve for the fleet over the life of the project, the net annual benefit would amount to  $\$85,800 \times 0.6309 = \$54,100$ .

47. There are at least two scallop resources available to Jonesport fishermen. One is located practically in the town's "front yard", where it would be both logical and essential that the vessels fishing these grounds be based at Jonesport. In addition, there are rich scallop grounds near Nova Scotia. Larger vessels would be required to fish these grounds, vessels which could only operate from Jonesport if the proposed improvement is accomplished. Local industry members do not believe that the local scallop beds are being fished to capacity, and they further state that exploitation of the off-shore grounds would increase scallop production substantially.

47a. Since there is already a scallop industry at Jonesport with existing firms located there interested in handling this high-value product, it is logical that further development of this resource be based at Jonesport and not at some other, more distant, and otherwise unsuitable harbor. Since dragger fishermen traditionally shift from species to species during different seasons, it is likely that the four new draggers, in addition to the existing fleet, would fish for scallops as well as for hake and shrimp. It is also possible that it would represent additional vessels added to the local fleet.

47b. It is expected that these vessels will land 195,000 lbs. of scallops annually by the end of 50 years, with an ex-vessel value of \$263,250. This is about one-quarter of the catch currently bought by Jonesport processors from Canadian suppliers, and will be in addition to current receipts. Since this additional scallop catch will be obtained partly by existing vessels and partly by new vessels, the operating costs will vary from 20 to 60 percent. Using a figure of 50 percent, the net annual benefit would be  $\$263,250 \times 0.50$  or \$131,600. The equivalent average annual benefit would amount to  $\$131,600 \times 0.3102 = \$40,800$ , based on straight line increase for 50 years.

48. It is expected that local fishermen will immediately take full advantage of the harbor improvements by fishing for underutilized species such as cod and flounder. Federal and State fisheries experts consider that the premise that such species as cod and flounder will be harvested by Jonesport fishermen is considered sound and the landings should indeed be considered as a net addition to the domestic fish supply. It

is emphasized that the fish currently trucked to Jonesport originate in Canada and represent, therefore, foreign fish production. Therefore, these foreign fish landings cannot be considered as a benefit to the Jonesport fleet. The new domestic production of cod and flounder to be obtained directly by the Jonesport fleet, will be over and above the quantity presently being trucked from Canada and thus constitute a legitimate benefit.

48a. The Jonesport fleet is expected to land 900,000 pounds of cod valued at \$117,000 and 100,000 pounds of flounder with an ex-vessel value of \$16,000. Using a cost of 20-percent of the ex-vessel value of the catch for operating expenses and assuming that the current supply by trucking from other points to Jonesport will continue at its present rate, the annual net benefit from this source would be \$106,400.

49. New Markets for dogfish have already been located. These markets, however, are not presently being filled, and the present landings for dogfish at Jonesport are negligible. Larger vessels are needed in order to develop this fishery, boats that cannot presently be handled at Jonesport without the proposed new facility. Since there is a relatively low margin of profit in this fishery, it is essential that it be carried out on a volume basis, and this will only be possible if the proposed improvement is accomplished.

49a. Annual landings of 500,000 pounds of dogfish valued at \$15,000 can be expected. The time required for the processor to provide supplies and equipment necessary to develop and support this market would be relatively short, thus constituting an immediate benefit. Thus, the net annual benefit would be  $\$15,000 \times 40\%$  (for operating expenses), or \$6,000.

50. An additional note concerning the above mentioned underutilized species. These species will be easily obtained by additional vessels to be added to the fleet, which will normally land mixed catches and thus will include underutilized species.

51. Lobster boats moored in the open Moosabec Reach are subjected to waves ranging up to 7 feet in height emanating from easterly storms. The boats break their moorings and drift aground on the rocky shoreline.

In the last ten years, scores of boats, lobster cars, and traps have been damaged at an estimated cost for repairs totaling \$47,000.

52. In February 1969, a 57-foot shrimp dragger broke is mooring west of the Jonesport-Beals Island bridge and was driven aground on the outer ledges of Barney's Cove by high winds during a north-east storm. The vessel sank but was refloated by the Coast Guard and towed to a calmer area for beaching. Loss estimates ran as high as \$25,000.

53. By mooring the boats and lobster cars in a sheltered anchorage, a savings could be realized in the cost of mooring tackle required to withstand buffeting from waves under existing conditions and from total loss of the moorings by ice floes in the open reach. The cost of mooring a lobster boat in the open reach amounts to \$350 per year and for the larger boats \$600 per year. Local interests have stated that a sheltered mooring area would reduce the annual mooring costs by \$150 for each of the lobster boats and \$300 each for the 9 existing carriers, trawlers, and seiners. This amounts to a total annual savings of \$10,200.

54. The 24 lobster fishermen who fish during the winter months encounter severe damage from ice floes varying in thickness from a few inches up to more than a foot. The tide currents flow east during flood and west on ebb tide with a velocity ranging up to 4 knots, causing the ice to become trapped in Moosabec Reach for long periods. The first two months of 1968 produced the worst ice conditions in years. The fishing boats were unable to operate more than four days of the sixty involved. In January 1968, the conditions caused owners to temporarily abandon their moorings and raft the boats together in solid ice behind some small piers. Three boats drifted away in the pack ice before they could be reached by their owners. A Coast Guard vessel retrieved the crafts but all three had to be pulled and re-planked. By moving into Sawyer Cove, the boats would still suffer some damage on occasion when the Coast Guard ice breakwater is occupied at other locations. With an improved anchorage and deep water at the public landing, the Coast Guard could clear channels to the boats for ready access. It is reasonable to assume that at least 85-percent of the

damage to these vessels could be eliminated. It has been determined that each lobster boat experiences at least \$200 damage annually from the ice and each of the 9 carriers, seiners and trawlers experience \$300 damage annually. Thus, the total annual benefits from a reduction in ice damage would amount to \$6,400.

55. The Washington County labor market area which includes Jonesport, has been classified as a Title IV (1) redevelopment area. The latest data available (May 1970) for the Washington County area indicates that 2,050 persons out of a total work force of 10,400 were unemployed, including skilled, semi-skilled, and unskilled. Redevelopment benefits for the Jonesport navigation improvement were computed by estimating the direct labor costs for construction, operation and maintenance and by estimating the labor to be hired from the redevelopment area. The average number of workers required to construct the proposed project is estimated to be 26. Of this number, 13 could be obtained from the local unemployed or underemployed work force, consisting of skilled, semi-skilled and unskilled workers. The estimated time required to construct the project is 1.5 years. Wages to the locally unemployed or underemployed are estimated at \$161,594. This is equal to an average annual redevelopment benefit of \$9,500 based on a 5-1/2-percent interest rate and a 50-year project life. An additional \$300 in redevelopment benefits will be realized from wages paid to unemployed persons for operation and maintenance of the project. Computations of redevelopment benefits are shown on TABLE II.

TABLE II

JONESPORT HARBOR - COMPUTATION OF REDEVELOPMENT BENEFITS

<u>Labor Category</u>	<u>Avg. No. of Men Required</u>	<u>Man-hours Required for Project Const. (1)</u>	<u>Hourly Avg. Wage(2)</u>	<u>Total Labor Costs</u>	<u>% Paid to Workers Obtained from ARA Force</u>	<u>Wages Paid to Locally Unemployed or Underemployed</u>
Skilled	8	21,120	6.25	\$132,000	10	\$ 13,200
Semi-Skilled	4	10,560	5.25	55,440	25	13,860
Unskilled	<u>14</u>	<u>36,960</u>	4.55	<u>168,168</u>	80	<u>134,534</u>
Totals	26	68,640		\$355,608		\$161,594

(1) Each worker assumed to work 1,760 hours per year for construction period of 1.5 years.

(2) Based on wages rates obtained from U.S. Department of Labor.

Annual Redevelopment Benefits Initial Construction:

$$\begin{aligned} & \$161,594 \times 0.05906 \text{ (CRF, } 5 \frac{1}{2}\% \text{ 50 yr. life)} = \$9,544 \\ & \text{SAY } \$9,500 \end{aligned}$$

Annual Redevelopment Benefits from O & M:

(Assumed to be reduced from full value to 0 after 20 yrs. Present worth factor for uniformly decreasing annuity from 1 to 0 in 20 years at  $5 \frac{1}{2}\%$  = 7.3

Annual O & M costs: 1 May 1972 price levels \$19,000.

Assume 40% of O & M costs is labor cost \$7,600.

Assume 10% of labor costs for ARA  $\$760 \times 7.3 \times 0.05906 = \$328$  SAY \$300

Total Annual Redevelopment Benefits \$ 9,800



56. The evaluated benefits for navigation improvements at Jonesport Harbor are summarized below:

#### SUMMARY OF ANNUAL BENEFITS

<u>Description</u>	<u>Amount</u>
Increased lobster catch	\$120,000
Increased herring catch	36,000
Increased shrimp and hake catch	54,100
Increased scallop catch	40,800
Under utilized species (incl. dog fish)	112,400
Reduction of mooring and lobster car damage	10,200
Reduction of boat damage from ice floes	6,400
Redevelopment	
a. Construction	9,500
b. Operation and maintenance	300
TOTAL ANNUAL BENEFITS	<u>\$389,700</u>

#### COMPARISON OF BENEFITS AND COSTS

57. Comparison of the evaluated benefits of \$389,700 and the annual charges of \$229,500 results in a benefit-cost ratio of 1.7 to 1.0.

#### COORDINATION WITH OTHER AGENCIES

58. All Federal, State and local agencies having an interest in the Jonesport Harbor study were notified of the public hearing held in Jonesport on 4 April 1968. Representatives of the town of Jonesport, the Economic Development Administration, the State Sea and Shore Fisheries and various other State and town officials have been consulted during the study. Comments of these agencies are contained in APPENDIX B. A draft environmental impact statement has been prepared and coordinated with all affected interests.

#### LOCAL COOPERATION

59. The proposed improvement would result in general benefits to the public, thus local interests would not be required to contribute toward the cost of the proposed improvement. However, they would

be required to provide, maintain, and operate a public landing in Sawyer Cove, open to all on equal terms, and other standard items of cooperation as listed under "RECOMMENDATIONS".

## DISCUSSION

60. The town of Jonesport depends almost entirely upon the fishing industry for its existence. There is no protected anchorage area on the Jonesport side of Moosabec Reach to accommodate all of the locally-based fishing fleet. Consequently, most boats are moored in the open off privately owned wharves where they are subjected to storm generated waves ranging up to 7 feet in height approaching from the eastern end of the Reach. Ice obstructs navigation in the Reach during the winter months. The combined effect of wind, waves, tidal currents and ice floes tear boats from their moorings, driving them ashore, resulting in severe damage. Because of the exposed location of the main waterfront, none of the piers are equipped with float landings which could ease fishing operations. Since the mean tidal range is 11.5 feet, fishermen must either climb ladders fastened to the piers with their fishing gear or push skiffs across mudflats to reach their boats at low water.

61. Because of these adverse conditions local interests requested the construction of a breakwater forming a protected anchorage for the local fleet. As there is no public landing in Jonesport for use by all fishing vessels, they also requested that the breakwater be designed to incorporate a public landing. Investigation of the problem revealed that Sawyer Cove offered the only area suitable for development of a protected anchorage for the 50 lobster boats and 9 commercial fishing vessels which operate out of Jonesport.

62. Probings taken at the entrance to Sawyer Cove in the immediate area of the proposed breakwater site indicated that foundation conditions were too unstable to construct a conventional type rubble mound breakwater. It was found that the most feasible and least costly protection could be afforded by a caisson type sheet pile structure extending south-westward from Henry Point a distance of 1,200 feet. The breakwater would furnish protection for a sufficiently large area inside Sawyer Cove which could be dredged to accommodate all of the existing lobster boats and the 9 commercial

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fishing vessels, operating from Jonesport leaving room for expected expansion of the local fleet. Under extreme winter weather conditions, there would still be some delay in operations but the Coast Guard ice breaker could concentrate on keeping channels open within the cove rather than spend time rescuing boats from the path of drifting ice floes in Moosabec Reach as occurs under existing conditions.

63. Subsequent to the public hearing held in Jonesport on 4 April 1968, at which local interests requested consideration of a combined public landing and breakwater, town officials proceeded to obtain Federal funds through the Economic Development Administration to construct a public landing in Sawyer Cove to serve as a common site to land fish catches. This landing would serve the same purpose as the original request, to have a landing incorporated in the breakwater structure. During the course of the breakwater study, it was found that the most economical method of providing a public landing was to separate this facility from the breakwater and locate it at a more suitable site within Sawyer Cove which happened to be the same site picked for the EDA project. By removing the public landing from the breakwater considerable savings could be realized in the design of the breakwater structure, by being able to lower the top elevation to a point where a small amount of wave run-up could be allowed to pass over the top of the structure under the worst storm conditions without causing damages or intolerable wave action within the anchorage areas.

64. The ratio of benefits to costs, as stated in paragraph 57, indicates that the recommended plan is economically justified. The benefits resulting from the improvement are entirely general in character. Hence, local interests should not be required to contribute toward the cost of the breakwater and anchorage. They would be required to meet the requirements of local cooperation stated under "RECOMMENDATIONS". A public meeting was held in Jonesport on 24 May 1972 to advise the public of the findings of this report.

#### STATEMENT OF FINDINGS

65 As Division Engineer of the New England Division, Corps of Engineers, I have reviewed and evaluated, in the overall public interest, all pertinent data concerning the proposed plan of improvement, as well as the stated views of other interested agencies and

the concerned public, relative to the various practicable alternatives in providing a safe mooring area for commercial fishermen operating in Jonesport Harbor.

66. The possible consequences of alternatives have been studied according to (a) engineering feasibility, (b) environmental impacts, (c) economic factors of the regional and national resource development and (d) other social well-being considerations in the public interest. The aspects of these issues have already been stated at length in the formulation of the plan of improvement and in other sections of this report. In summary there are substantial benefits to be derived from providing local fishermen with a protected mooring area and a public landing in Sawyer Cove which is the only area in Jonesport Harbor where such an improvement could be economically provided. It is noted that the improvement would cause a minor disruption of the environment during dredging and building of the breakwater through temporary turbidity at the construction site. Also, the breakwater when completed would change the aesthetic appearance of the area immediately adjacent to the entrance to the cove. Due to the dependence of the local economy on the fishing industry, it is considered that these adverse environmental effects would be more than offset by improvement in the economic growth of the area. Local interests are firmly convinced that an increase in employment with a resulting increase in property values would not be realized without the proposed navigation improvements.

67. I find that the proposed action as developed in the "CONCLUSIONS" and "RECOMMENDATIONS", is based on thorough analysis and evaluation of various practicable alternative courses of action for achieving the stated objective; that wherever adverse effects are found to be involved they cannot be avoided by following reasonable alternative courses of action which would achieve the Congressionally specified purposes; that where the proposed action has an adverse effect, this effect is either ameliorated or substantially outweighed by other considerations. The recommended action is consonant with national policy, statutes and administrative directives and on balance, the total public interest should best be served by the implementation of the recommended proposal.

## CONCLUSIONS

68. The Division Engineer concludes that the proposed improvement would meet the needs for navigation in Jonesport Harbor and is economically justified by reason of protecting, maintaining and promoting the fishing industry through provision of a protected harbor for general navigation.

## RECOMMENDATIONS

69. The Division Engineer recommends construction of a cellular steel pile breakwater to elevation 18 feet above mean low water extending from Henry Point southwest for a distance of 650 feet then west across the entrance to Sawyer Cove, an additional distance of 550 feet; an entrance channel 100 feet wide, 8 feet deep, leading from deep water in Moosabec Reach into Sawyer Cove; two anchorages within the cove of 9 acres, 6 feet deep and 6 acres, 8 feet deep, respectively, as shown on the accompanying maps. The estimated cost of the project is \$3,560,000 with an estimated \$19,200 annually for maintenance. The project is recommended subject to the requirements that local interests:

a. Provide, maintain and operate a public landing in Sawyer Cove, open to all on equal terms with berthing depths alongside the landing commensurate to the entrance channel. The landing should include an adequate access road, parking area and suitable related facilities;

b. Hold and save the United States free from all damages which may result from the construction and subsequent maintenance of the project;

c. Provide without cost to the United States, all lands, easements and rights-of-way required for construction and subsequent maintenance of the project and for aids to navigation;

d. Regulate the use, growth and free development of the harbor facilities with the understanding that they will be open to all on equal terms;

e. Establish regulations prohibiting discharge of untreated sewage, garbage and other pollutants in the waters of Jonesport Harbor by users thereof, which regulation shall be in accordance with applicable laws or regulations of Federal, State and local authorities responsible for pollution prevention and control.

f. Agree to furnish spoil disposal areas, upon request of the Chief of Engineers, without cost to the United States if any such areas are required, including such dikes, bulkheads, and embankments as may be necessary for subsequent maintenance of the project. For purposes of project evaluation, the cost for dredging has been based on disposal at some ocean site to be selected specifically during the design stage between all affected Federal, State, and local governmental agencies. However, should nearby land areas be made available and are acceptable and suitable to all concerned, the dredged materials would be pumped to the site hydraulically as this is the least costly method. Hence, the need for this item of local cooperation.

JOHN H. MASON  
Colonel, Corps of Engineers  
Division Engineer

## APPENDIX A

### BREAKWATER DESIGN CRITERIA AND ANALYSIS

1. Jonesport Harbor is exposed to storm waves generated from the east to southeast. The axis of the harbor is approximately east-west. It is claimed that storms with winds from an easterly direction produce rough seas which sweep through Moosabec Reach. Also ice floes become trapped in the Reach during the winter months. These actions render the existing mooring areas in the open reach unfit for anchorage and subjects fishing vessels to considerable damage.
2. The only area in Jonesport Harbor where vessels could seek sanctuary is Sawyer Cove. A breakwater at the mouth of the cove, generally, as desired by local interests would reduce storm and ice damages and best serve the navigational needs of the harbor.
3. Refraction studies relative to determining design wave heights at the entrance to Sawyer Cove were made for wind generated waves approaching Moosabec Reach from the east over an unlimited fetch. A group of small islands and ledge outcrops located at the eastern entrance to Moosabec Reach effectively break up the deep water wave train into confused seas of smaller short period waves. Due to the irregularity of the bottom contours in this area it was found that refraction coefficients were reduced too far to be reliable within the confines of Moosabec Reach. Instead, the design wave height was based on wave heights up to 8 feet observed in the center of the Reach. At the entrance to Sawyer Cove, these waves are reduced to a maximum of 6 feet. On this basis, a design wave height of 5 feet was determined.
4. Diffraction wave studies were made for several breakwater layouts to determine the effectiveness of the individual alignments and sites in reducing storm waves entering the cove. It was considered that if the refracted 6-foot wave approaching the entrance could be reduced to less than 3 feet in the geometric shadow of the breakwater it would provide a safe anchorage for fishing craft. The studies indicated that a 1200-foot long breakwater was the most effective in reducing the storm waves to less than 3 feet at the anchorage area in the cove.

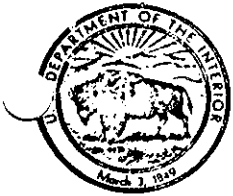
5. Probings and borings taken along the most effective breakwater alignment indicated poor foundation conditions exist for design of a conventional rubble mound breakwater structure. Moving the breakwater alignment to a point further inside the cove would not provide sufficient space behind the breakwater to accommodate the existing and prospective fishing fleet nor would there be an improvement in the foundation conditions. Therefore, left with no alternative site, the breakwater design had to be based on use of material other than stone. Timber, steel and concrete sheet piling were then considered for use in breakwater construction. Only marine type steel offered the life expectancy needed for the proposed structure. Designs were investigated using steel piling in various ways, including a single row of piling with buttresses, double walls held together with tie rods separated into compartments by cross walls and cellular steel pile structures. The latter design of cellular steel pile proved to be the most stable and economical structure. Cellular steel sheet pile structures require little maintenance and are suitable for construction in depths up to 40 feet on all kinds of foundations. Corrosive action is the principal disadvantage in sea water, However, in this area there is practically no movement of sand to act as an abrasive force. With the use of marine type steel a heavy plastic protective coating and proper electrical cathodic protection it is expected that the sheet piling could serve for the proposed project life.

6. The soil exploration data indicated that the bottom material is not consolidated enough to support sheet piling. Therefore, it is considered necessary to dredge a trench to a depth of 25 feet below mean low water, 75 feet wide, backfilling the trench with sand and gravel to form a stable base for the caissons. The caisson type breakwater was designed to provide protection for a mean spring tide elevation of 13.2 feet above mean low water and a design wave height of 5.0 feet, based on maximum depth conditions. Analysis was made for all wave and ice forces on the structure including such factors as overturning, sliding, interlock tension, vertical shear within the fill material, impact loading, and all other structural design factors considered critical to caisson design, in accordance with EM 1110-2-2906 and Technical Report No. 4, "Shore Protection, Planning and Design." The circular cells are self-supporting and can be filled individually thus facilitating construction ease.



7. Based on the above analysis it was found that the sheet piling should be driven to a minimum depth of 10 feet into the prepared foundation. The diameter of the cells should be 30 feet and the interlocking diaphragms should have a radius of 12 feet. Thirty-four cells are required for a 1200 foot long breakwater. The crest elevation required to prevent overtopping by the design wave would be 19.0 feet. However, since the public landing would not be located on the breakwater and at this elevation storm overtopping would occur only under extreme high spring tide conditions, it was considered safe and economically justified to lower the top elevation to +18.0 feet. This would result in about one foot of water passing over the structure at design stillwater level of 13.6 feet and no more than 2 feet under extreme high spring tide conditions combined with a maximum wave of 6 feet. Under the extreme conditions only a 2-foot wave could be regenerated behind the breakwater structure.

8. The cells would be filled with sand and coarse gravel to elevation +15 and the entire structure would be capped with a 3-foot thick layer of cover stone to prevent erosion of the fill material.



UNITED STATES  
DEPARTMENT OF THE INTERIOR  
FISH AND WILDLIFE SERVICE  
BUREAU OF SPORT FISHERIES AND WILDLIFE  
U. S. POST OFFICE AND COURTHOUSE  
BOSTON, MASSACHUSETTS 02109

March 3, 1972

(In lieu of February 18, 1972 report)

Division Engineer  
New England Division  
U. S. Army Corps of Engineers  
424 Trapelo Road  
Waltham, Massachusetts 02154

Dear Sir:

This report supersedes our August 5, 1970, and November 2, 1971, Conservation and Development Reports on the fish and wildlife resources related to plans for navigation improvements at Jonesport (Washington County), Maine, and provides a reappraisal of the commercial fisheries in Jonesport under "with-the-project" and "without-the-project" conditions.

This report has been coordinated with the Maine Department of Sea and Shore Fisheries, the National Marine Fisheries Service, and the Environmental Protection Agency.

We understand that the project plans have changed since our 1970 Conservation and Development Report. Project plans now include a 1200-foot breakwater, a nine-acre anchorage dredged to six feet below mean low water, and a six-acre anchorage dredged to eight feet below mean low water. In addition, an entrance channel 100 feet wide, dredged to a depth of eight feet below mean low water, has been included in project plans.

The current appraisal is based on 1970 landings plus new species potential which will occur, provided the project is constructed.

Lobster: Based on 1970 landings and prices, fifty Jonesport fishing boats land 1,498,000 pounds of lobster annually, valued at \$1,498,000. Elimination of delays caused by rough weather, tidal range, and ice conditions will result in an estimated twenty additional fishing days per year, resulting in increased landings of 150,000 pounds of lobster valued at \$150,000.

Shrimp, Hake, and Scallops: Five small Jonesport trawlers currently fish for scallops, shrimp, and hake in season. Catches by species for 1970 were as follows:

Shrimp: 374,000 pounds with an ex-vessel value of \$74,800  
Hake: 31,000 pounds with an ex-vessel value of \$990  
Scallops: 14,800 pounds with an ex-vessel value of \$20,000

Four new trawlers in the 60-foot class are also expected to be added to the Jonesport fishing fleet, as a result of harbor improvements. These boats, over the life of the project, are expected to increase the annual landings by an average of 640,000 pounds of shrimp with an ex-vessel value of \$128,000, and 960,000 pounds of hake with an ex-vessel value of \$86,400. Inshore scallop grounds are now being utilized to almost maximum capacity. With the improved harbor facilities, however, large draggers are expected to fish the rich Nova Scotia scallop grounds and land about 195,000 pounds annually at Jonesport, with an ex-vessel value of \$263,250. This is approximately one-quarter of the catch currently bought by Jonesport processors from Canadian suppliers.

Herring: New markets are developing for large herring to be used for bloaters and smokers. We estimate an additional 150,000-pound catch in this class, valued at \$45,000 annually, will be landed by Jonesport-based fishermen.

Under-utilized Species: Following harbor improvements, several under-utilized species, now being trucked in, are expected to be caught by the Jonesport fleet in the following quantities: 900,000 pounds of cod (quadruple the 1970 Washington County landings) with an ex-vessel value of \$117,000 and 100,000 pounds of flounder (9 times the 1970 Washington County landings) with an ex-vessel value of \$16,000.

A Jonesport processor has found a European outlet for dogfish (used for fish sticks and fish and chips). This species is abundant, but is not being utilized at present. Annual landings of 500,000 pounds with an ex-vessel value of \$15,000 is expected.

The estimated average annual value for all species landed "without-the-project" totals \$1,594,000. Under "with-the-project" conditions, total Jonesport landings are expected to yield an added annual net benefit of \$821,000. The net benefits attributed to the project represent gross revenue received in 1970 at both the fisherman and processing levels, less associated costs and wage payments to the fishermen.

We appreciate the opportunity to comment on your report.

Sincerely yours,

*Richard E. Griffith*  
Regional Director



DEPARTMENT OF TRANSPORTATION  
UNITED STATES COAST GUARD


Address reply to:  
COMMANDER (oan)  
First Coast Guard District  
J. F. Kennedy Federal Bldg.  
Government Center  
Boston, Mass. 02203  
Tel: 617-223-3632

10500  
14 JAN 1972

From: Commander, First Coast Guard District  
To: Division Engineer, U. S. Army, Corps of Engineers, Waltham,  
Massachusetts

Subj: Survey at Jonesport Harbor, Maine

1. A review of the preliminary survey map of Jonesport Harbor, Maine, dated November 1971, indicates that one unattended light on the end of the breakwater with an estimated cost of \$12,000.00 and an annual maintenance cost of approximately \$200.00 will adequately mark the harbor.

  
RANSOM K. BOYCE  
By direction

Encl: (1) Corps of Engineers survey map



STATE OF MAINE  
ENVIRONMENTAL IMPROVEMENT COMMISSION  
AUGUSTA, MAINE 04330

May 25, 1972

Colonel Frank P. Bane  
Corps of Engineers  
Division Engineer  
U.S. Army Engineer Division, New England  
424 Trapelo Road  
Waltham, Mass. 02154

Re: NAVIGATION IMPROVEMENTS  
Jonesport Harbor, Maine

Dear Colonel Bane:


The Maine Environmental Improvement Commission recommends that extreme caution be exercised in the site selection for the deposit of the dredged spoil from the Jonesport Harbor project.

The Commission is quite naturally concerned with both the short and long term damage effects that the massive disposal of this type will have on the water quality standards of the area. Although the most expedient, in general offshore disposal is not considered the best method of disposal because of the problems created by the charging of the biota.

Should a near-shore disposal site be selected, the containment of the spoil should be made so that both solids and liquids are restricted as to turbidity, BOD, and bacterial content. Any resulting discharge or seepage should not create hydraulic, water quality, or health hazard problems.

To insure water quality, the Maine Environmental Improvement Commission urges the U.S. Army Corps of Engineers that all information on the area be closely evaluated and analyzed, and forethought be utilized in the selection of either a land or water site.

Sincerely,

  
William R. Adams  
Director

PS/dc



STATE OF MAINE

DEPARTMENT OF SEA AND SHORE FISHERIES

STATE HOUSE ANNEX

CAPITOL SHOPPING CENTER

AUGUSTA, MAINE 04330

June 19, 1972

Colonel John H. Mason  
Department of the Army  
New England Division  
Corps of Engineers  
424 Trapelo Road  
Waltham, Massachusetts 02154

Dear Colonel Mason:

Reference is made to your letter of June 13 (NEDED-R), regarding the status of your navigation survey report on Jonesport Harbor.

Please be advised that the Department of Sea and Shore Fisheries is pleased that the Corps of Engineers is prepared to report favorably on this project. We believe, as we have indicated previously, that a safe anchorage area for the local fishing fleet is urgently needed at Jonesport, and it appears that the proposed plan of improvement will accomplish this purpose.

This Department is prepared to cooperate with the Corps on the various project stages that remain to be accomplished. In particular, we shall be ready with other Federal, State and local agencies to review any proposed spoil disposal areas that may be considered.

The opportunity to comment on this proposed improvement is appreciated.

Sincerely,

A handwritten signature in cursive script, reading "Richard P. Choate".  
RICHARD P. CHOATE  
Deputy Commissioner

RPC/ljc  
cc: Chairman of the Board  
of Selectmen, Jonesport

## OFFICE OF SELECTMEN

Jonesport, Maine 04649

18 August 1972

Colonel John H Mason  
Department of the Army  
New England Division  
Corps of Engineers  
424 Trapelo Road  
Waltham, Mass. 02154

Dear Colonel Mason:

Reference is made to your letter of 13 June 1972 NEDED-R regarding the town of Jonesport's willingness and ability to comply with items of local cooperation.

Please be advised that the Town has indicated its acceptance of the proposed improvement and is willing and able to meet the requirements as outlined in paragraph 2 of the referenced letter.

sincerely

*Harvey K Dunning*  
Harvey K Dunning, Chairman

## JONESPORT HARBOR, JONESPORT, MAINE

Information called for by Senate Resolution 148, 85th Congress, adopted 28 January 1958.

### 1. Navigation Problem

Jonesport Harbor is a stretch of shoreline forming the north side of Moosabec Reach located about 38 miles southwest of Eastport, Maine. The harbor extends about 3 miles along the Reach from Kelley Point on the east to Hopkins Point on the west. There is no existing Federal navigation project at Jonesport.

2. The principal navigation problems evolve from inadequately sheltered mooring areas for the locally based fishing fleet, particularly during easterly and southeasterly storms. Severe damage is also sustained during the winter from ice packs drifting through Moosabec Reach. This situation has discouraged fishermen from developing adequate landing facilities for their operations.

### 3. Improvement Considered

Consideration was given to providing a sheltered anchorage area inclosed by a breakwater structure at the main waterfront. A breakwater located far enough offshore in the Reach to provide an adequately sheltered mooring area would result in the breakwater being located in water depths in excess of 20 feet, resulting in an uneconomical improvement. Sawyer Cove is the only area which could offer some natural protection and is large enough to meet the needs for present and future anchorage requirements. The entrance to Sawyer Cove is shallow enough to minimize breakwater construction costs. To give full protection to the anchorage it would be necessary to extend the breakwater a minimum distance of 1,200 feet westward from Henry Point. Due to poor foundation conditions, it was found that a breakwater consisting of sheet steel pile cells offered the most economical design.

### 4. Recommended Improvement

To provide a protected anchorage area for the Jonesport fishing fleet the cellular steel pile breakwater is recommended. The plan of improvement consists of a breakwater extending 1,200 feet south-



westerly from Henry Point across the entrance to Sawyer Cove and an entrance channel 100 feet wide, 8 feet deep, leading from deep water in Moosabec Reach into Sawyer Cove including 2 anchorage areas, one 9 acres in area 6 feet deep and the other 6 acres, 8 feet deep at mean low water, Estimated first costs, annual costs and annual benefits are based on June 1972 price levels, a 50-year project life, and a 5 1/2 percent interest rate on Federal funds.

a. Estimated First Cost of Construction \$3,560,000

b. Estimated Annual Charges

Interest and Amortization	\$ 210,300
Maintenance cost for dredging and breakwater	19,000
Maintenance for aids-to-navigation	200
Total Estimated Annual Charges	\$ 229,500

c. Estimated Annual Benefits

Increased fish catch	\$ 363,300
Reduction of damages	16,600
Redevelopment area benefits	9,800
Total Estimated Annual Benefits	\$ 389,700

d. Benefit-cost Ratio: 1.7

## 5. Local Cooperation

In view of the general nature of the benefits to be derived local interests should not be required to contribute in cash toward the first cost of construction. However, local interests should be required to:

a. Provide and maintain an adequate public landing with suitable on-shore facilities and depths in the berthing areas commensurate to the Federal project, open to all on equal terms.

b. Provide, without cost to the United States, all lands, easements, and rights-of-way, necessary for construction and maintenance of the project.

c. Agree to furnish spoil disposal areas upon request of the Chief of Engineers, without cost to the United States if any such areas are required, including such dikes, bulkheads, and embankments as may be necessary for subsequent maintenance of the project.

d. Hold and save the United States free from any damages that may result from construction and maintenance of the project.

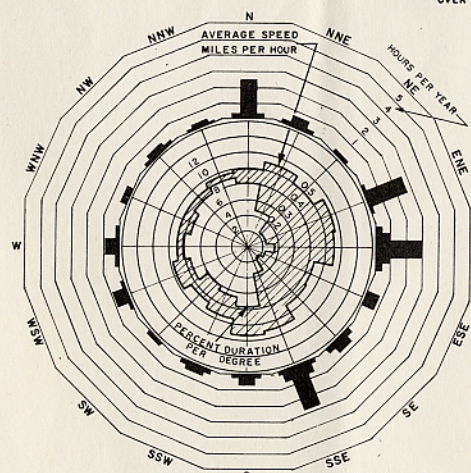
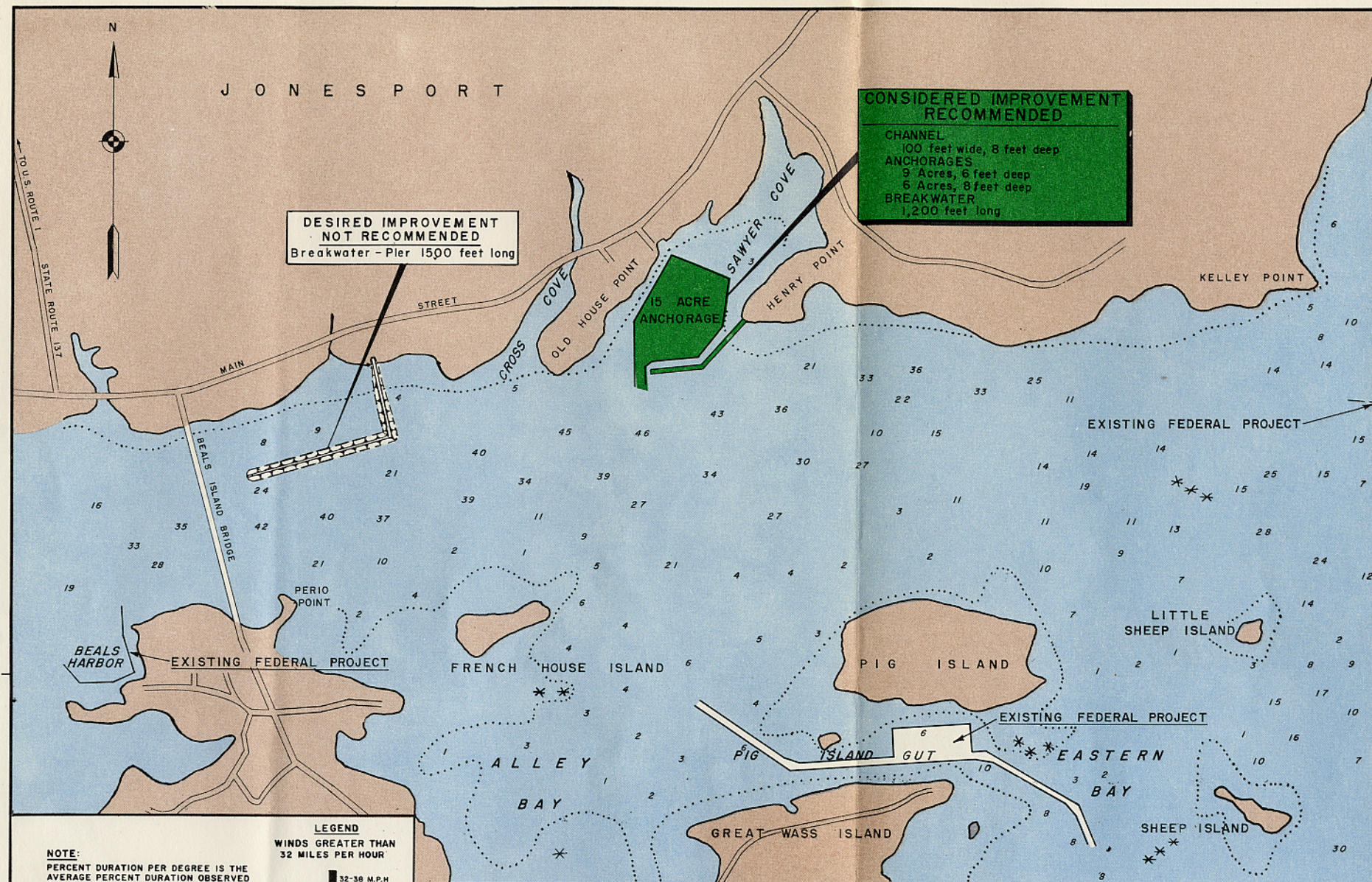
e. Establish a competent and properly constituted public body empowered to regulate the use, growth and free development of the harbor facilities with the understanding that said facilities will be open to all on equal terms.

f. Establish regulations prohibiting discharge of untreated sewage, garbage and other pollutants in the waters of Jonesport Harbor by users thereof, which regulation shall be in accordance with applicable laws or regulations of Federal, State and local authorities responsible for pollution prevention and control.

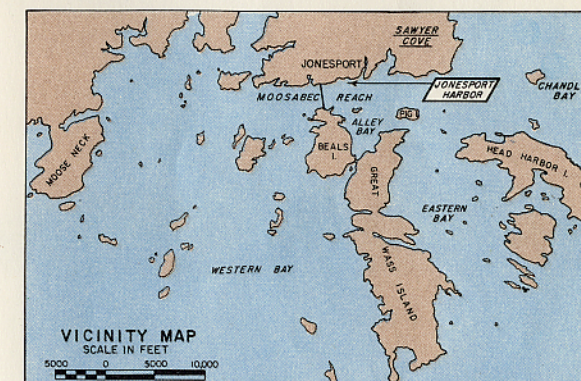
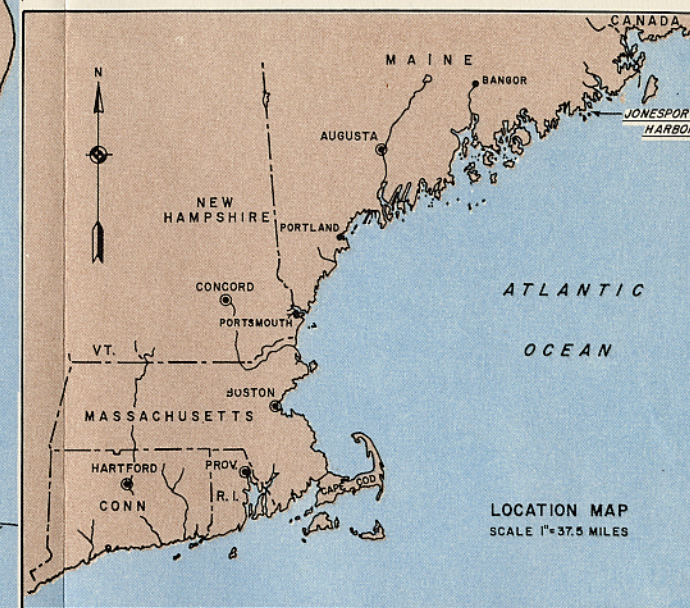
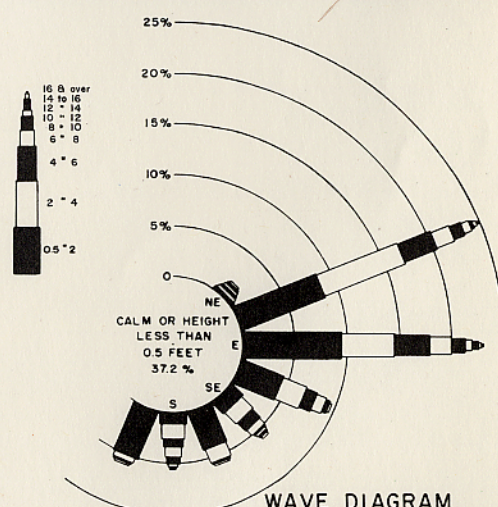
#### 6. Discussion

Local interests have approved the recommended plan and have indicated that the requirements of local cooperation will be met. The recommended plan of improvement would provide a logical and economically feasible means of meeting current and prospective needs of navigation in the harbor. The project is considered justified on the basis of the studies and criteria set forth in the report. Proposed local cooperation is consistent with requirements in other projects of this nature.





FROM BEACH EROSION BOARD TECHNICAL MEMORANDUM NO. 55



**NOTES:**  
Depths expressed in feet are taken from U.S.C. & G.S. chart No. 304 depths are referred to the plane of Mean Low Water.  
Approximate Mean Low Water shown thus .....

REVISION	DATE	DESCRIPTION	BY

DEPARTMENT OF THE ARMY  
NEW ENGLAND DIVISION  
CORPS OF ENGINEERS  
WALTHAM, MASS.

**JONESPORT HARBOR  
MAINE  
GENERAL MAP**  
SCALE IN FEET  
0 200 400 600

DR. BY: E. J. K. TR. BY: E. J. K. CL. BY: H. G. G.  
SUBMITTED: *Harmon H. Gupta II*  
PROJECT ENGINEER  
*Charles E. Brown*  
CHIEF, COASTAL DEVELOPMENT SECT.

APPROVAL RECOMMENDED: *Frank J. Brown*  
CHIEF, PLANNING SECT.

APPROVED: *W. W. ...* DATE: JUNE 1972

TO ACCOMPANY SURVEY REPORT DATED: 8-31-72

DRAWING NUMBER: 1959 D-8-2

SHEET 1 OF 2



